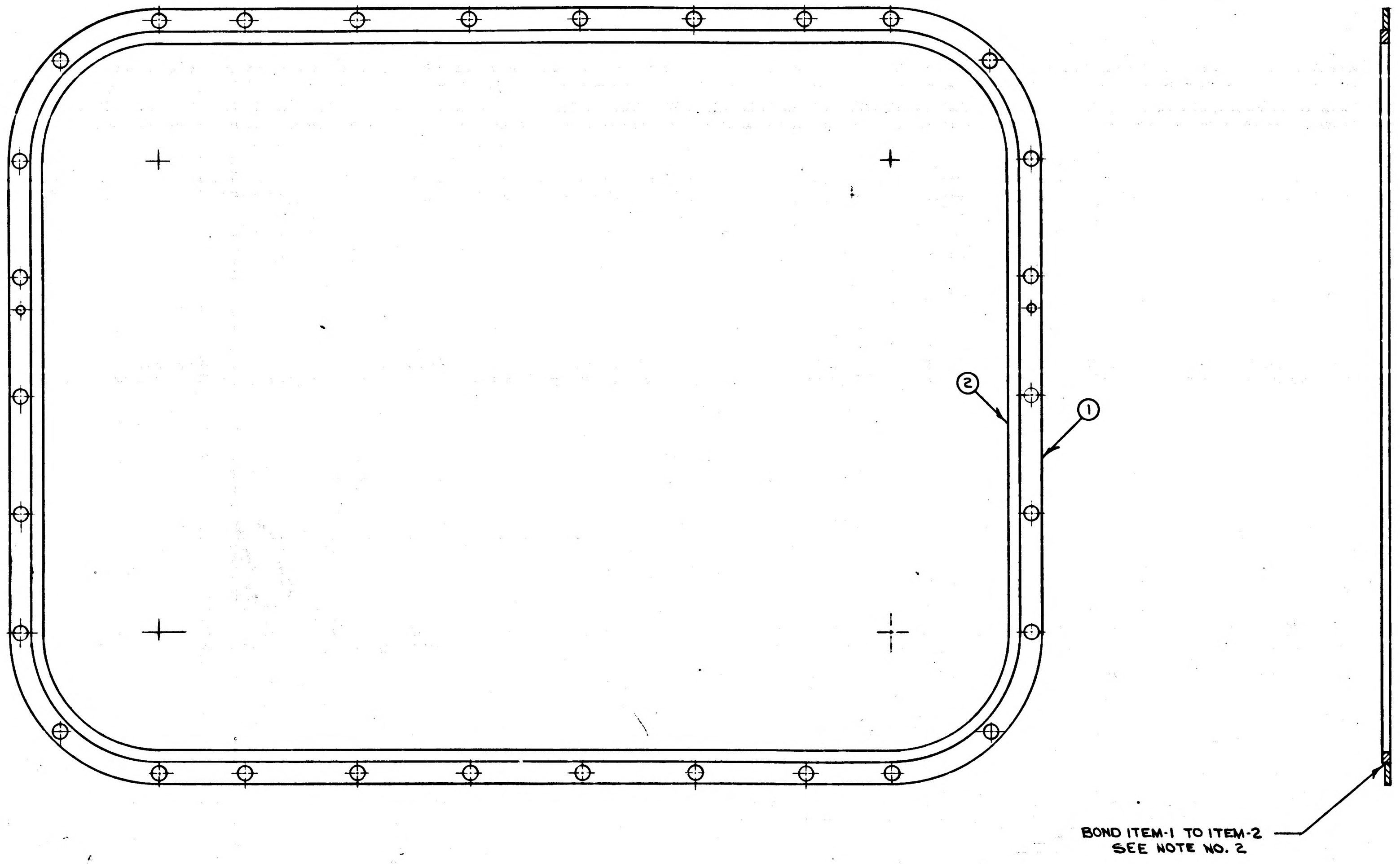
1696101

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				

NOTES:
1. -INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
? 2. -BOND ITEM NO. 1 TO ITEM NO. 2 ....
3. -IDENTIFY USING NASA PART NO., REVISION LETTER AND MFRS SYM (KIC) PER ND 1002019



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 DATE 7/28/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		1019680	16020180360		GASKET - RECTANGULAR			
1	1		1019692	16020180370		RETAINER-GASKET HANDLING CONTAINER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
101	101

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 170201800040
DRAWN J. CAROILE DATE 7-1-64
CHECKED 7-1-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL A C [illegible] 7/28/64
K IT APPROVAL 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER & GASKET
ASSY

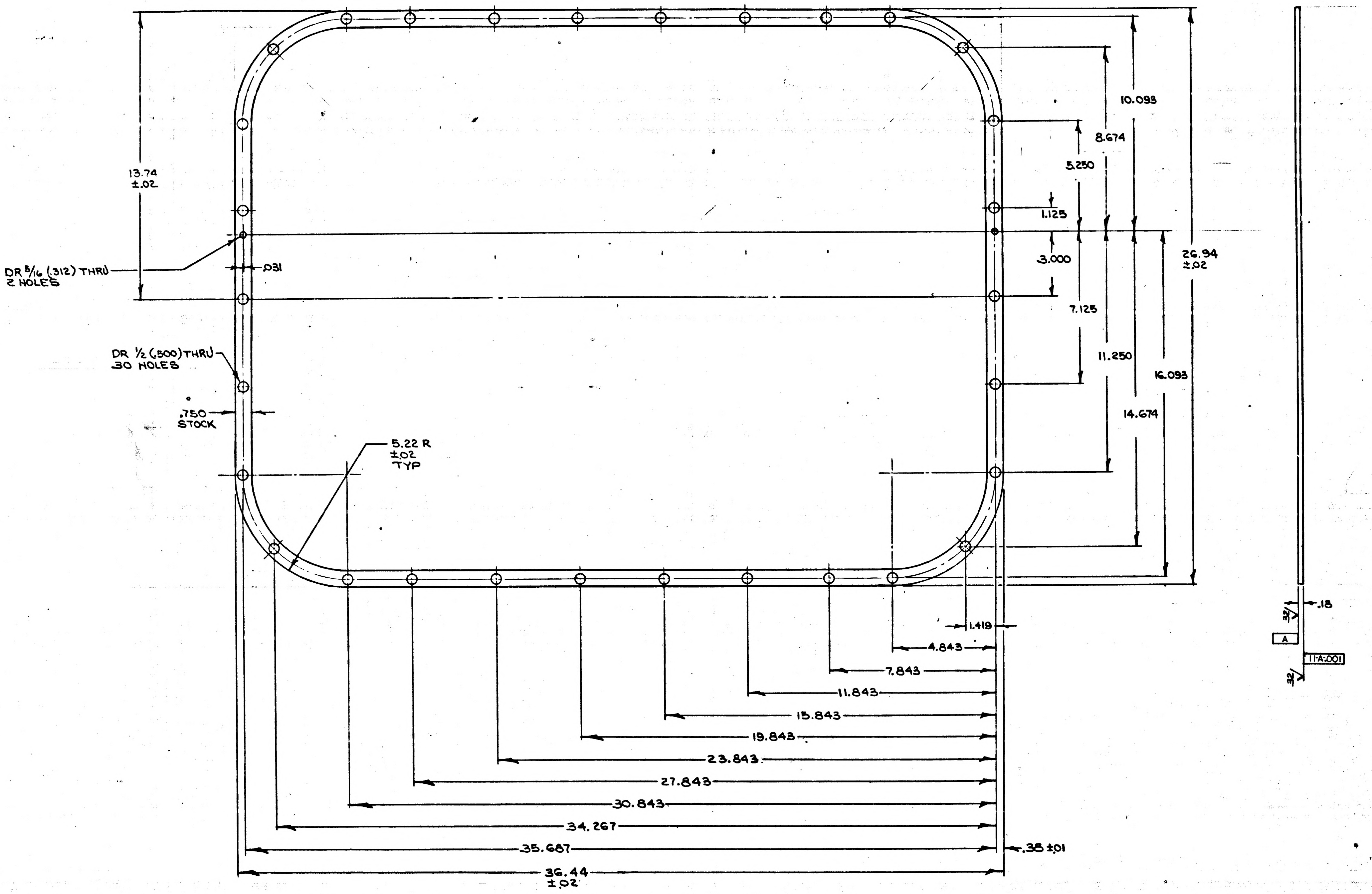
CODE IDENT NO.
SIZE E
NASA NUMBER 1019691
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF

1019691

1019692

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. - INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. - GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. - $\sqrt{125}$ FINISH ALL OVER UNLESS OTHERWISE NOTED.
4. - REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. - FINISH: ALODINE 1200 PER KPS 5A.300


13.74
±.02
DR 5/16 (.312) THRU
2 HOLES
.031
DR 1/2 (.500) THRU
30 HOLES
.750
STOCK
5.22 R
±.02
TYP
10.093
8.674
5.250
1.125
3.000
7.125
11.250
14.674
16.093
26.94
±.02
1.419
4.843
7.843
11.843
15.843
19.843
23.843
27.843
30.843
34.267
35.687
36.44
±.02
.38 ±.01
.18
32
A
1 A .001

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 11273 DATE 7/28/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019691	101

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	±

DO NOT SCALE THIS DRAWING
MATERIAL ALUM. ALLOY 6061-T6 PER FED. SPEC. QQ-A-325
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180370
DRAWN T. CARBILE DATE 7-1-64
CHECKED B. Lilly 7-1-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL
KIT APPROVAL 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER-GASKET
HANDLING CONTAINER

CODE IDENT NO. SIZE E NASA NUMBER 1019692
SCALE 1:2 WEIGHT CALC ACTUAL SHEET 1 OF 1

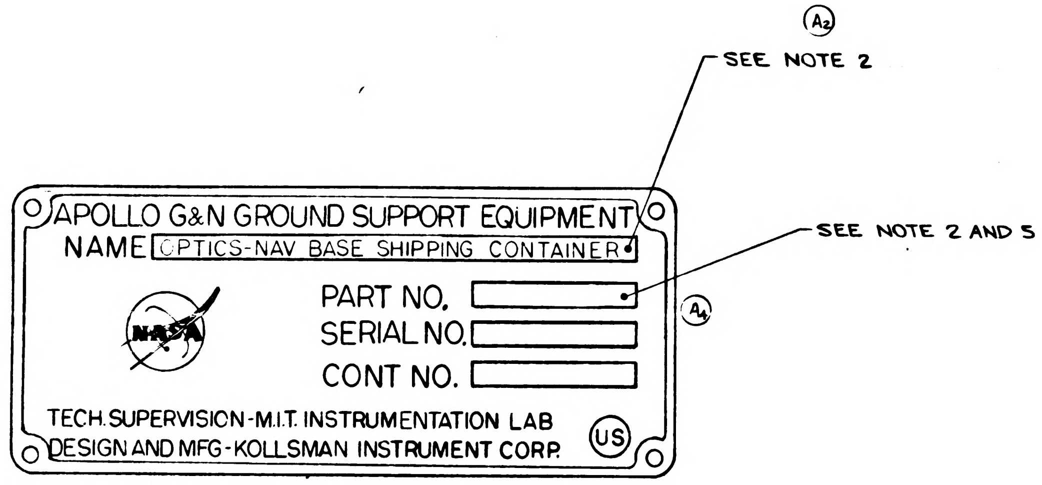
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ENGRAVE CHARACTERS .125 HIGH × .010 MAX DEEP AND FILL IN WITH BLACK STENCIL PASTE. (A₁₀)
3. USE BLANK NO. 1019122.
4. IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND1002019 ON BACK OF PLATE.
5. ENGRAVE PART NO. PER CHART AS APPLICABLE. (A₁)

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A₁₀		REVISED PER ECO 116061 TDRR 25753 DATE 1-31-66	2-11-66 M S.	2/1/66

(A₈)

(A₂)


SEE NOTE 2
SEE NOTE 2 AND 5
APOLLO G&N GROUND SUPPORT EQUIPMENT
NAME OPTICS-NAV BASE SHIPPING CONTAINER
PART NO.
SERIAL NO.
CONT NO.
NASA
TECH.SUPERVISION-M.I.T. INSTRUMENTATION LAB
DESIGN AND MFG-KOLLSMAN INSTRUMENT CORP.
US
A₄

(A₅)

DASH NO.	PART NO.
1019693	1019720
1019693-001	1019720-011

(A₉)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019720	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT: NAS 9-497 (A₆)

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180380
DRAWN B. Pulver DATE 7-2-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE,
IDENTIFICATION
(A₇)

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019693
SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

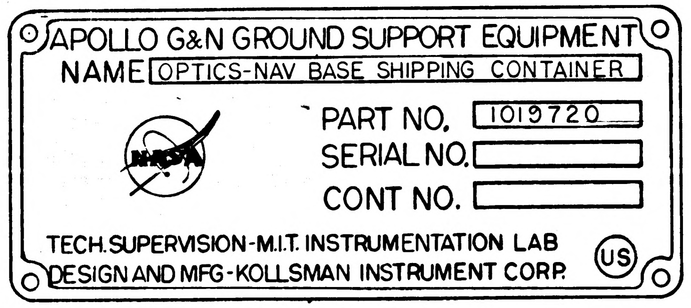
1019693

1019693

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ENGRAVE CHARACTERS .125 HIGH × .010 MAX DEEP & FILL IN WITH BLACK STENCIL PASTE.
3. USE BLANK NO. 1019122.
4. IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND1002019 ON BACK OF PLATE.


APOLLO G&N GROUND SUPPORT EQUIPMENT
NAME OPTICS-NAV BASE SHIPPING CONTAINER
PART NO. 1019720
SERIAL NO.
CONT NO.
NASA
TECH.SUPERVISION-M.I.T. INSTRUMENTATION LAB
DESIGN AND MFG-KOLLSMAN INSTRUMENT CORP.
US

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11286 DATE 8/4/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019720	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180380
DRAWN B Pulver DATE 7-2-64
CHECKED F F Plesche 7/2/64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
PLATE, IDENTIFICATION
CODE IDENT NO.
SIZE D
NASA NUMBER 1019693
SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

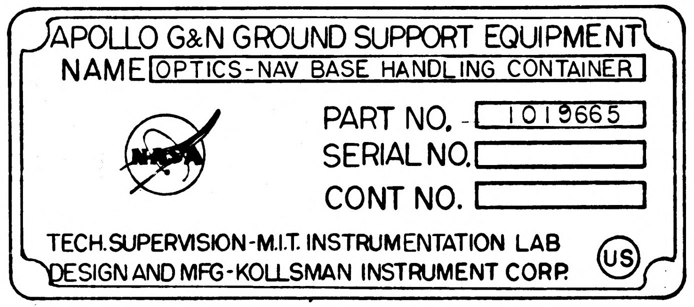
1019694

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ENGRAVE CHARACTERS .125 HIGH × .010 MAX DEEP & FILL IN WITH BLACK STENCIL PASTE.
3. USE BLANK NO. 1001658.
4. IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND1002019 ON BACK OF PLATE.


APOLLO G&N GROUND SUPPORT EQUIPMENT
NAME OPTICS-NAV BASE HANDLING CONTAINER
PART NO. 1019665
SERIAL NO.
CONT NO.
NASA
TECH.SUPERVISION-M.I.T. INSTRUMENTATION LAB
DESIGN AND MFG-KOLLSMAN INSTRUMENT CORP.
US

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11286 DATE 8/4/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019665	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180390
DRAWN B Pulver DATE 7-2-64
CHECKED Earl Sargatz 7-23-64
APPROVAL L. Nurnona 7-23-64
APPROVAL
NASA APPROVAL
MIT APPROVAL 4 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE,
IDENTIFICATION

CODE IDENT NO.
SIZE D
NASA NUMBER 1019694
SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

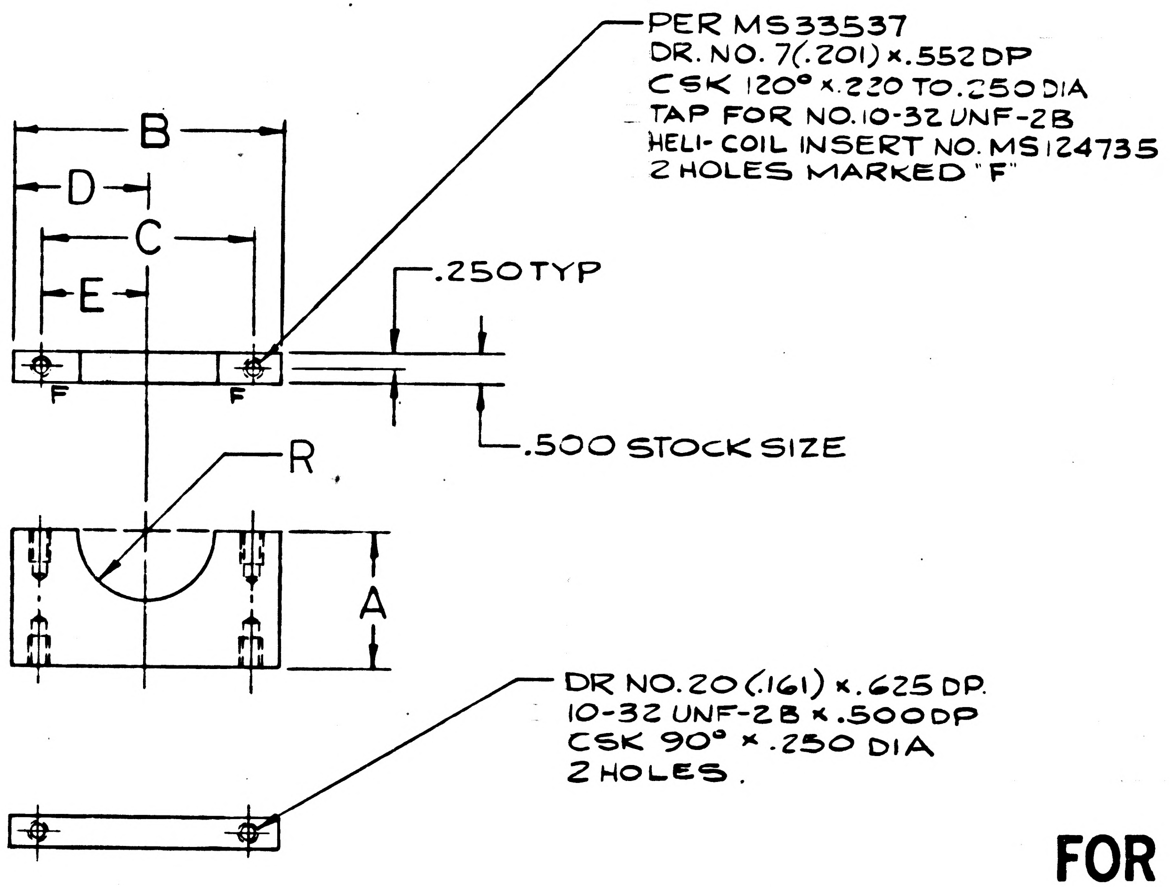
INCHES

A	1019695

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A1		REVISED PER ECP NO. 106607 TDRR 13716 DATE 10/20/64	8-6-64 B.R.	9-16-64

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- REMOVE BURRS PER ND1002079
3- GENERAL MACHINING STANDARDS PER ND1002078.
4- ALL SURFACES SHALL BE TREATED AND FINISHED IN ACCORDANCE WITH MIL-F-14072 (SIG.C) P513 TYPE II. APPLY TWO (2) COATS OF CASHMERE BLUE ENAMEL PER NASA DWG NO. 1016194. MASK INSIDE OF RADIUS BEFORE PAINTING.
5- IDENTIFY PER ND1002019



PER MS33537
DR. NO. 7 (.201) x .552 DP
CSK 120° x .220 TO .250 DIA
TAP FOR NO. 10-32 UNF-2B
HELI-COIL INSERT NO. MS124735
2 HOLES MARKED "F"

DR NO. 20 (.161) x .625 DP.
10-32 UNF-2B x .500 DP
CSK 90° x .250 DIA
2 HOLES.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 DATE 7/25/64

(A1)

NASA DASH NO.	DIMENSIONS					
	A	B	C ±.005	D	E	R
-1	1.750	5.000	4.125	2.500	2.062	1.343
-2	2.250	4.500	3.625	2.250	1.812	1.187
-3	3.625	4.750	3.875	2.375	1.937	1.250
-4	2.250	4.500	3.625	2.250	1.812	1.000

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

APPLICATION

NEXT ASSY	USED ON
1019843	1019720
1019841	1019720
1019839	1019720
1019698	1019720

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .015	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM ALLOY
2024-T4
QQ-A-250/4 TEMP T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180180

DRAWN N. MAZZA DATE 6-26-64
CHECKED F. F. Plesch 7-2-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL A C [illegible] 7/28/64
7/28/64
MIT APPROVAL 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BLOCK, SUPPORT
(EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 1019695

SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019695 A1

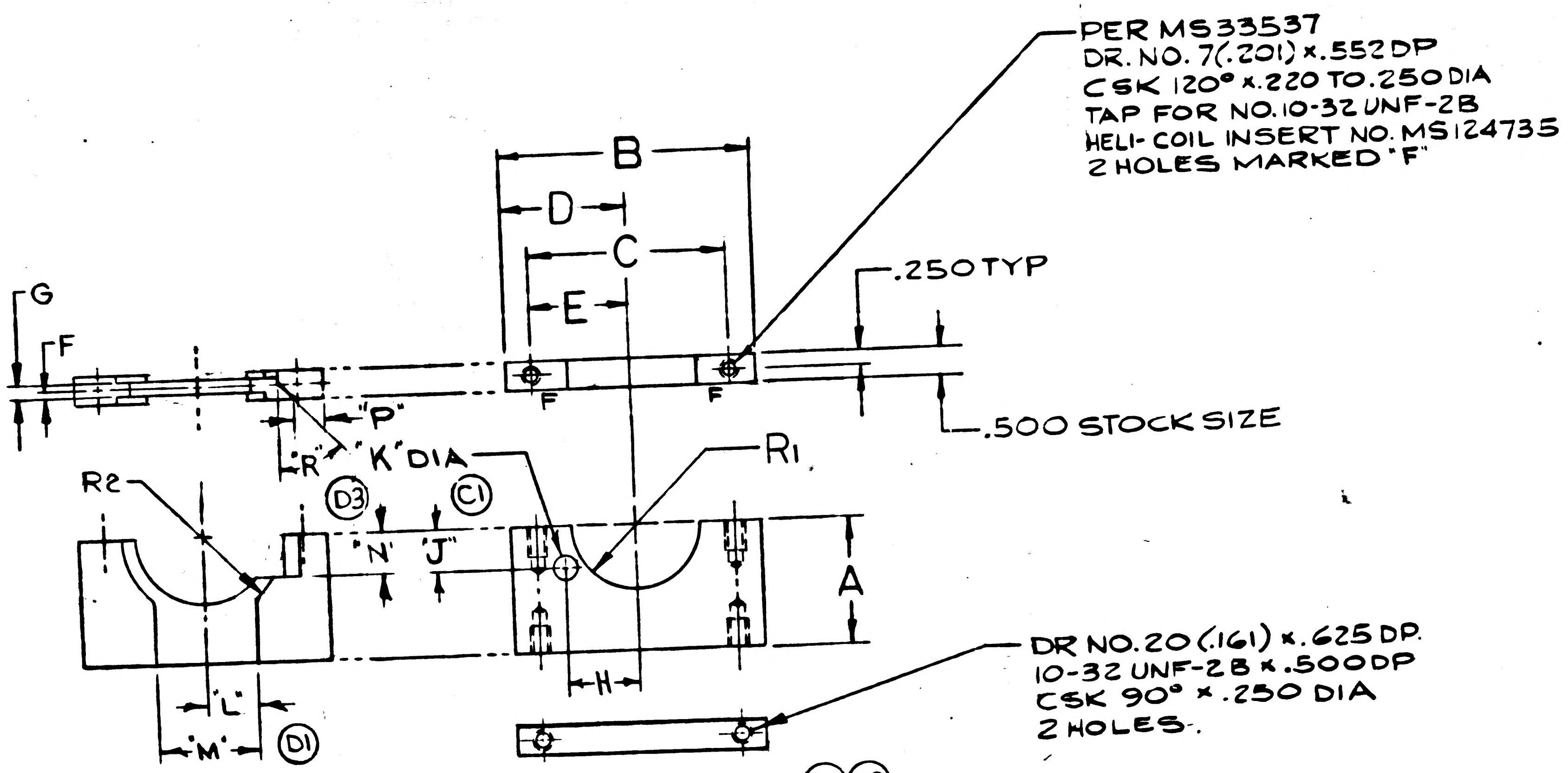
AD-1340

1019695 D

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 11273 DATE 7-28-64				
A1		REVISED PER ECP NO. 106607 TDRR 13716 DATE 10/29/64	8-6-64 B.R.	9-16-64
B	B4	REVISED PER ECP NO. 108978	10/28/64 BR	
C2		REVISED PER ECP NO. 107996 TDRR 14887 DATE 12/11/64	12/2/64	
D3		REVISED PER ECP NO. 109301 TDRR 15925 DATE 2-2-65	1-25-65	

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- REMOVE BURRS PER ND1002079.
3- GENERAL MACHINING STANDARDS PER ND1002078.
4- ALL SURFACES SHALL BE TREATED AND FINISHED IN ACCORDANCE WITH MIL-F-14072 (SIG.C) P513 TYPE II. APPLY TWO (2) COATS OF CASHMERE BLUE ENAMEL PER NASA DWG NO. 1016194. MASK INSIDE OF RADIUS BEFORE PAINTING.
5- IDENTIFY PER ND1002019


PER MS33537
DR. NO. 7 (.201) x .552 DP
CSK 120° x .220 TO .250 DIA
TAP FOR NO. 10-32 UNF-2B
HELI-COIL INSERT NO. MS124735
2 HOLES MARKED "F"
B
D
C
E
G
F
.250 TYP
F
F
"P"
"R"
"K" DIA
R1
.500 STOCK SIZE
R2
D3
C1
"N"
"J"
A
H
"L"
"M"
D1
DR NO. 20 (.161) x .625 DP.
10-32 UNF-2B x .500 DP
CSK 90° x .250 DIA
2 HOLES.

B C2

A1

NASA DASH NO.	DIMENSIONS A	B	C ±.005	D	E	R1	R2	F	G	H	J	K DIA	L	M	N	P	R
-1	1.750	5.000	4.125	2.500	2.062	1.343							1.000	2.000	.750	.500	45°
-2	2.250	4.500	3.625	2.250	1.812	1.187	1.593	.125	.250								
-3	3.625	4.750	3.875	2.375	1.937	1.250				1.625	.750	.500					
-4	2.250	4.500	3.625	2.250	1.812	1.000											

D2

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

APPLICATION

NEXT ASSY	USED ON
1019843	1019720
1019841	1019720
1019839	1019720
1019698	1019720

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .015	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM ALLOY
2024-T4
QQ-A-250/4 TEMP T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180180

DRAWN N. MAZZA DATE 6-26-64
CHECKED F. F. Plesche 7-2-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL A C 7/18/64
7/21/64
MIT APPROVAL 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BLOCK, SUPPORT
(EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 1019695
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

adw. L.m

AD-1340

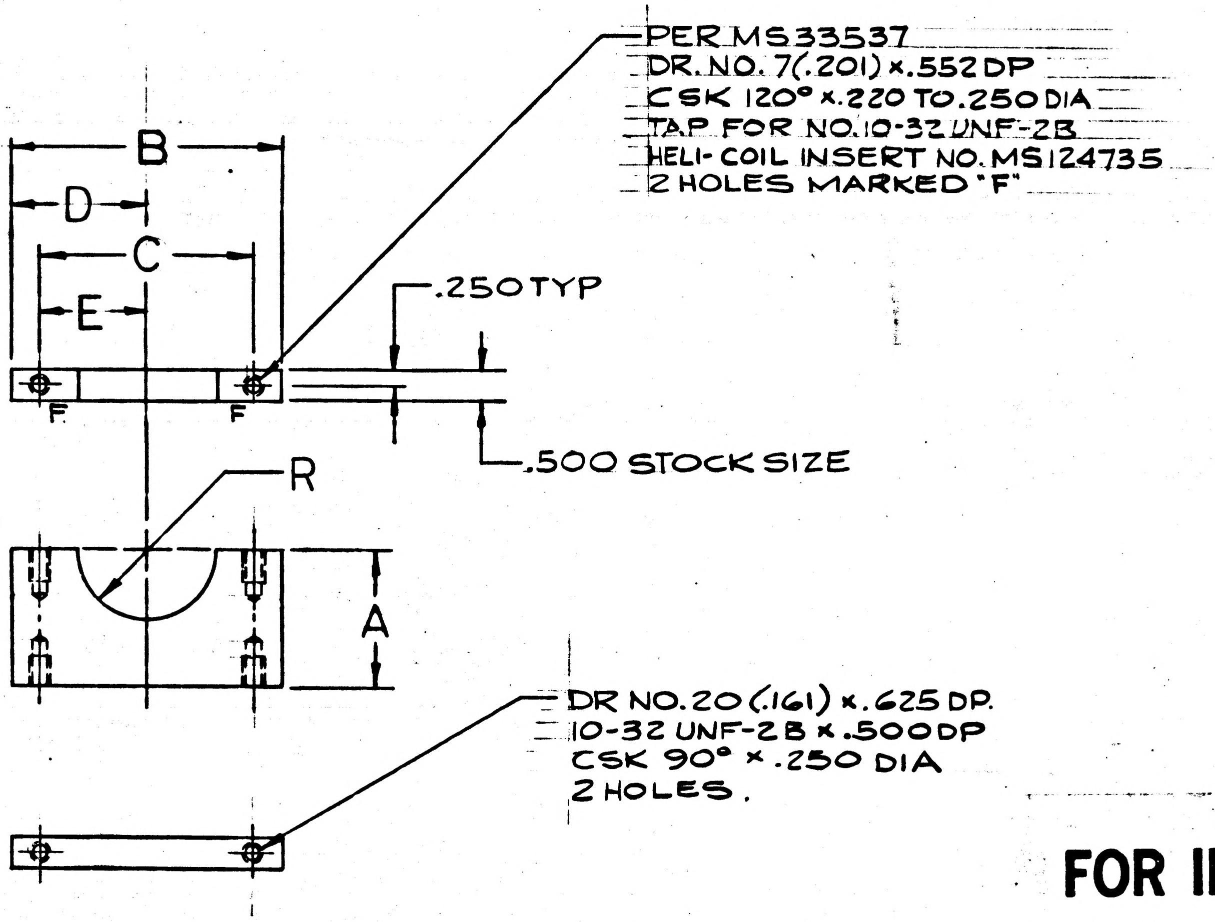
1019695 D

5696101

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- REMOVE BURRS PER ND1002079.
3- GENERAL MACHINING STANDARDS PER ND1002078.
4- ALL SURFACES SHALL BE TREATED AND FINISHED IN ACCORDANCE WITH MIL-F-14072 (SIG.C) P513 TYPE II. APPLY TWO (2) COATS OF CASHMERE BLUE ENAMEL PER NASA DWG. NO. 1016194. MASK INSIDE OF RADIUS BEFORE PAINTING.
5- IDENTIFY PER ND1002019



PER MS33537
DR. NO. 7 (.201) × .552 DP
CSK 120° × .220 TO .250 DIA
TAP FOR NO. 10-32 UNF-2B
HELI-COIL INSERT NO. MS124735
2 HOLES MARKED "F"

DR NO. 20 (.161) × .625 DP.
10-32 UNF-2B × .500 DP
CSK 90° × .250 DIA
2 HOLES.

NASA DASH NO.	DIMENSIONS A	B	C ±.005	D	E	R
-1	1.750	4.750	3.875	2.375	1.937	1.250
-2	2.250	4.500	3.625	2.250	1.812	1.187
-3	3.625	5.000	4.125	2.500	2.062	1.343

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 DATE 7/28/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019841	1019720
1019839	1019720
1019698	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: FRACTIONS ± ~ DECIMALS ± .015 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL ALUM ALLOY 2024-T4 QQ-A-250/4 TEMP T4
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 1602018 0180
DRAWN N. MAZZA DATE 6-26-64
CHECKED F. J. Plesch 2-2-64
APPROVAL 2-2-64
APPROVAL
NASA APPROVAL A. C. 7/28/64
7/28/64
MIT APPROVAL 7/21/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE BLOCK, SUPPORT (EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 1019695
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

AD-1340

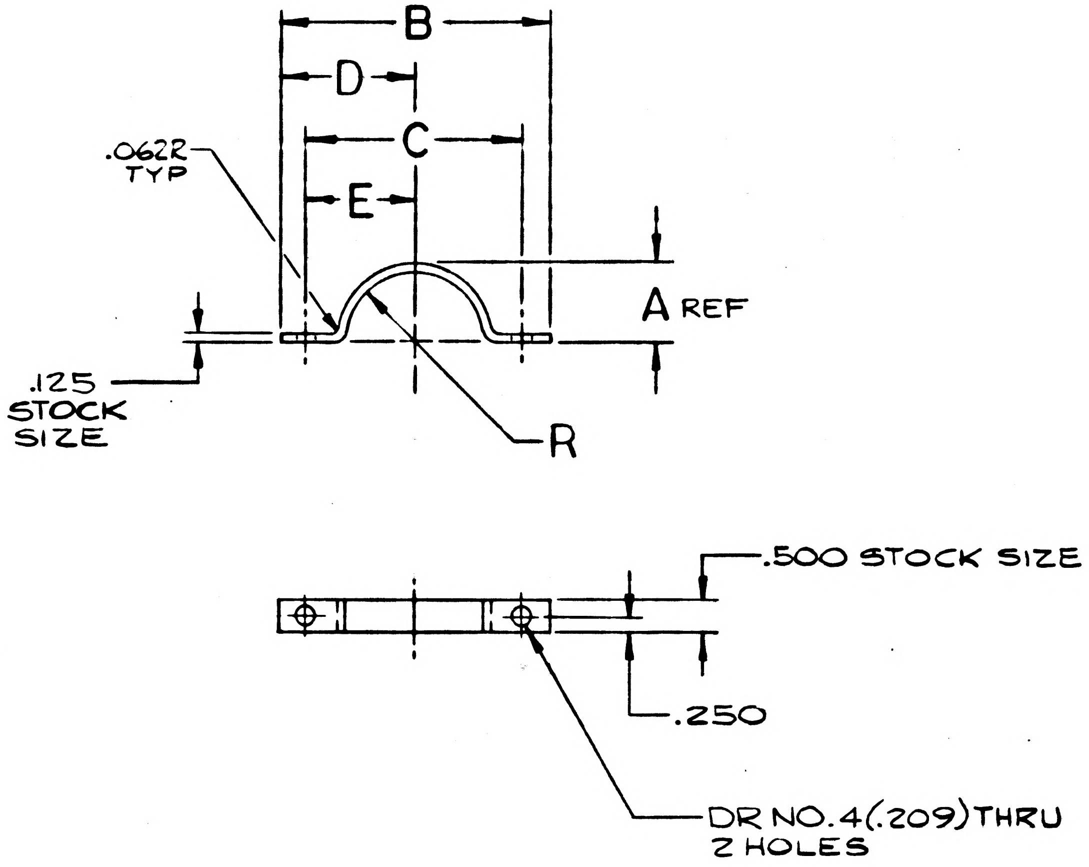
1019695

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

9696101

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A1	A6	REVISED PER ECP NO 106608 TDRR NO 13501	8/6/64	ECP 106608

NOTES:-
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- REMOVE BURRS PER ND1002079.
3- GENERAL MACHINING STANDARDS PER ND1002078.
4- ALL SURFACES SHALL BE TREATED AND FINISHED IN ACCORDANCE WITH MIL-F-14072 (SIG C) P513 TYPE II. APPLY TWO (2) COATS OF CASHMERE BLUE ENAMEL PER NASA DWG NO. 1016194. MASK INSIDE OF RADIUS BEFORE PAINTING.
5- IDENTIFY PER ND1002019



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 **DATE**

Ⓐ

NASA DASH NO.	DIMENSIONS					
	A	B	C ±.005	D	E	R
-1	1.468	5.000	4.125	2.500	2.062	1.343
-2	1.312	4.500	3.625	2.250	1.812	1.187
-3	1.375	4.750	3.875	2.375	1.937	1.250
-4	1.125	4.500	3.625	2.250	1.812	1.000

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019843	1019720
1019841	1019720
1019839	1019720
1019698	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: FRACTIONS ± ~ DECIMALS ± .015 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ALUM ALLOY 6063-T5 QQ-A-200/9 TEMP T5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180400
DRAWN N.MAZZA DATE 7-1-64
CHECKED F. J. Plescha 7-2-6[illegible]
APPROVAL [illegible] 7-2-67
APPROVAL
NASA APPROVAL Al Metzger 7/28/64
[illegible] 7/28/64
MIT APPROVAL [illegible] 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE CLAMP, SUPPORT BLOCK (EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 1019696
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

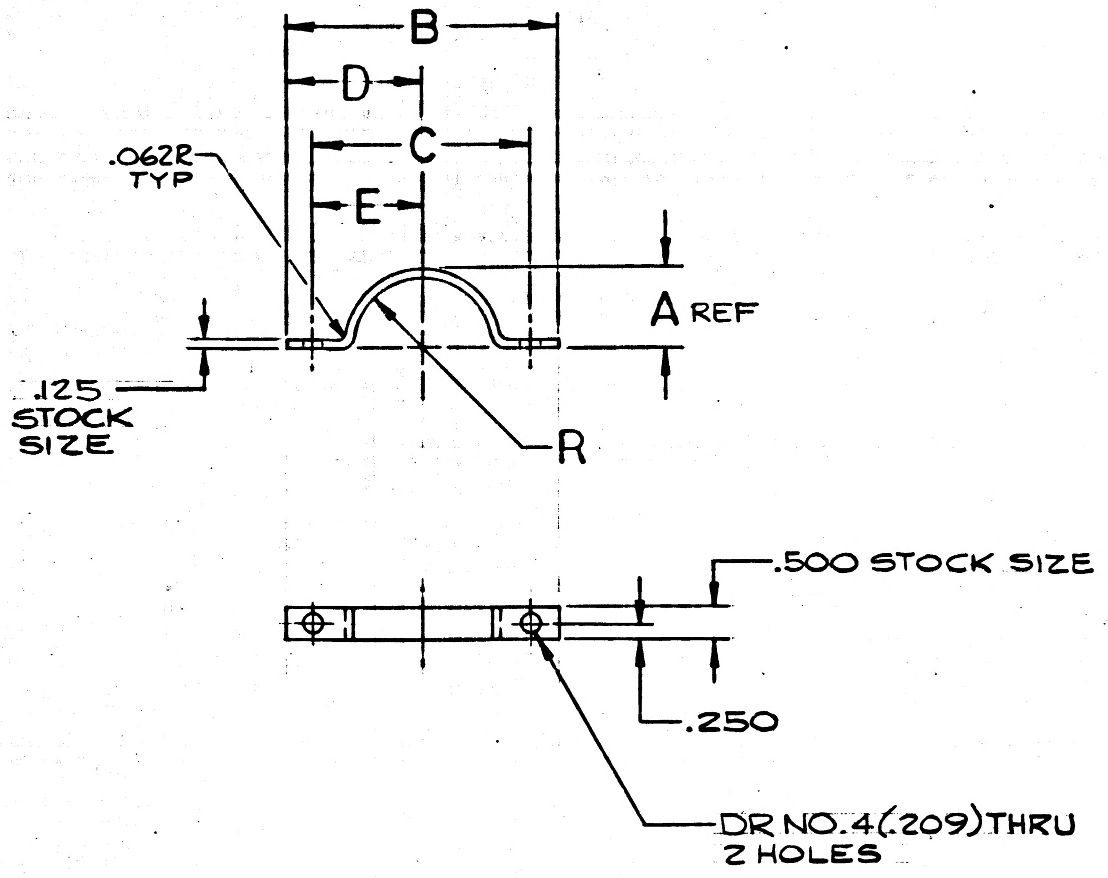
1019696

AD-1340

9696101

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- REMOVE BURRS PER ND1002079.
3- GENERAL MACHINING STANDARDS PER ND1002078.
4- ALL SURFACES SHALL BE TREATED AND FINISHED IN ACCORDANCE WITH MIL-F-14072 (SIG C) P513 TYPE II. APPLY TWO (2) COATS OF CASHMERE BLUE ENAMEL PER NASA DWG NO. 1016194. MASK INSIDE OF RADIUS BEFORE PAINTING.
5- IDENTIFY PER ND1002019



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11223 DATE

NASA DASH NO.	A	B	C ±.005	D	E	R
-1	1.375	4.750	3.875	2.375	1.937	1.250
-2	1.312	4.500	3.625	2.250	1.812	1.187
-3	1.468	5.000	4.125	2.500	2.062	1.343

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019841	1019720
1019839	1019720
1019698	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .015 ; ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL: ALUM ALLOY 6063-T5 QQ-A-200/9 TEMP T5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180400
DRAWN N.MAZZA DATE 7-1-64
CHECKED F.J. Pleschat 7-2-64
APPROVAL Wayn 7-2-67
APPROVAL
NASA APPROVAL A.L. Metzger 7/28/64
7/28/64
MIT APPROVAL 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, SUPPORT BLOCK
(EYEPIECE)

CODE IDENT NO. SIZE C NASA NUMBER 1019696
SCALE NONE WEIGHT CALC ACTUAL SHEET 1 OF 1

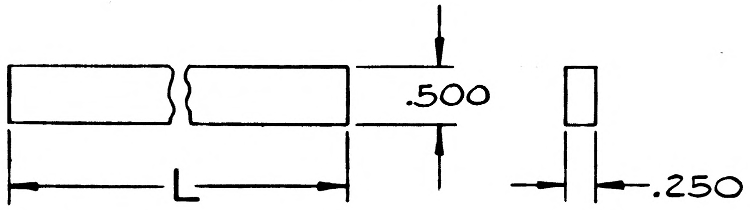
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 1019697

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP NO. 106609 TDRR NO. 13715 DATE 10/20/64	8/7/64 BJR	9-16-64 ASA

NOTE:-
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- MATL: NEOPRENE PER SPEC. MIL-R-6855 CLASS 2, GRADE 40.
3- IDENTIFY PER ND1002019



Ⓐ

NASA DASH NO.	LENGTH "L"
-1	4.187
-2	3.687
-3	3.875
-4	3.125

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 **DATE** 7/22/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019843	1019720
1019841	1019720
1019839	1019720
1019698	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .020	± ~

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180410
DRAWN N. MAZZA DATE 7-1-64
CHECKED 7-1-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL A C 7/28/64
7/28/64
MIT APPROVAL 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE STRIP, CUSHION

CODE IDENT NO.
SIZE C
NASA NUMBER 1019697
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1340

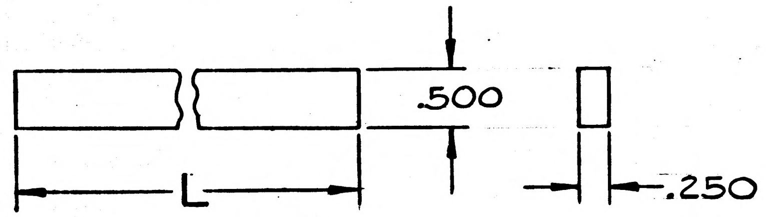
1019697 A

6 5 4 3 2 1

L696101

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTE:-
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- MATL: NEOPRENE PER SPEC. MIL-R-6855 CLASS 2, GRADE 40.
3- IDENTIFY PER ND1002019



NASA DASH NO.	LENGTH "L"
-1	3.875
-2	3.687
-3	4.187

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 1273 **DATE** 7/28/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019841	1019720
1019839	1019720
1019698	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .020	± ~

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020180410

DRAWN N. MAZZA DATE 7-1-64
CHECKED F.F. Plesche 7-2-64
APPROVAL 7-2-64
APPROVAL

NASA APPROVAL A C 7/28/64
7/28/64
MIT APPROVAL L Hazel 7/28/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE STRIP, CUSHION

CODE IDENT NO.
SIZE C
NASA NUMBER 1019697

SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

AD-1340

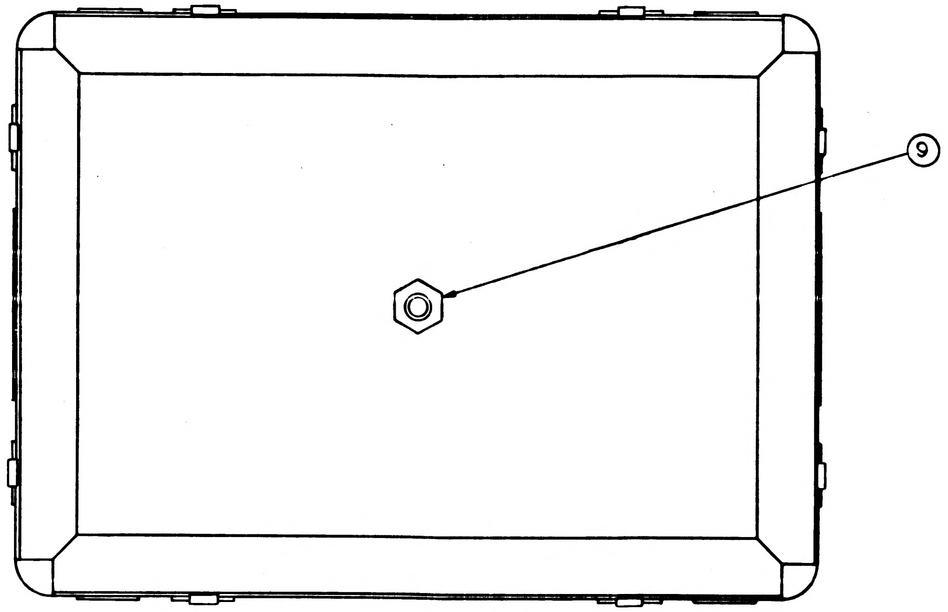
6 5 4 3 2 1

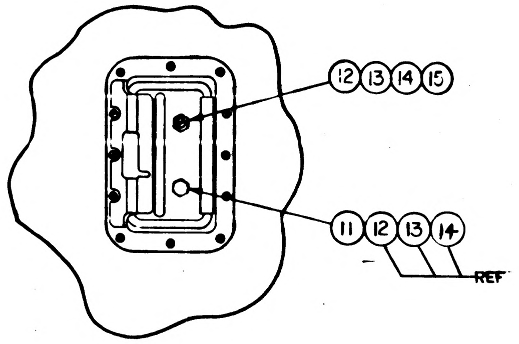
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

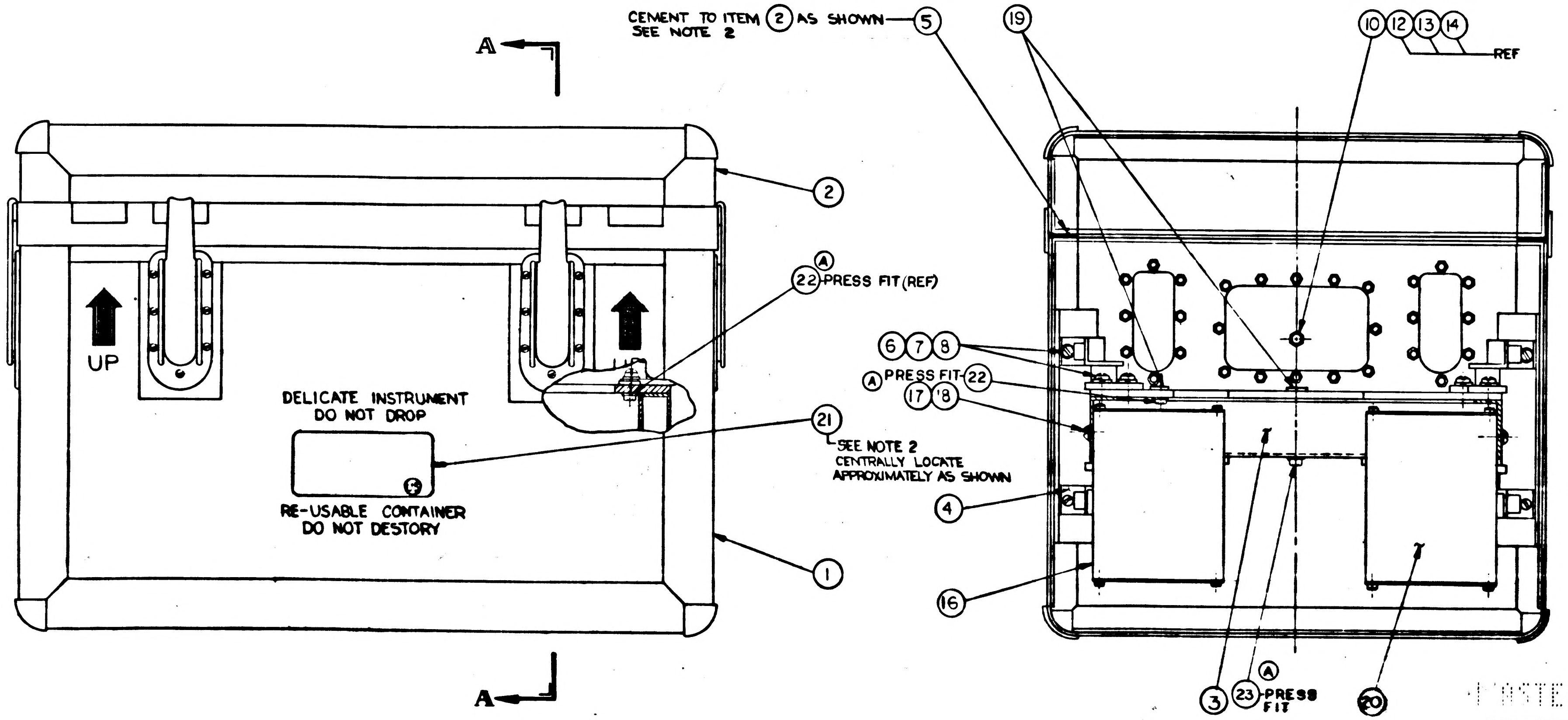
NOTES:
1-INTERDRET DWG DER MIL-D-70327
2-CEMENT WITH EC-826 MIL-A-5092 TYPE III
3-IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019

A 1019699

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	C7 C4 F8	REVISED PER ECPN0104812 TDRR 10337 DATE 6/11/64	~~6-8-64~~ ALR	




12 13 14 15
11 12 13 14 REF


A
A
CEMENT TO ITEM 2 AS SHOWN SEE NOTE 2
5
19
10 12 13 14 REF
2
A 22 PRESS FIT (REF)
UP
UP
DELICATE INSTRUMENT DO NOT DROP
RE-USABLE CONTAINER DO NOT DESTORY
21
SEE NOTE 2 CENTRALLY LOCATE APPROXIMATELY AS SHOWN
1
6 7 8
A PRESS FIT 22
17 18
4
16
3
A 23 PRESS FIT
20

SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05427 DATE 5-12-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
23	1		1001679-1	16020120530-1		NUT, SPLINE			
Ⓐ 22	2		1001679-2	16020120530-2		NUT, SPLINE			
21	1		1019192	03386900755		PLATE, IDENTIFICATION			
20	1		1019600	17020120010		CONTAINER ASSY, SXT EYEPIECE			
19	3		1019655	16020120430		PAD			
18	4		MS35338-81	74439003005		WASHER, LOCK			
17	4		AN520C10-8			SCREW, ROUND HEAD SLOTTED			
16	1		1019601	17020120020		CONTAINER ASSY, SCT EYEPIECE			
15	1		AN816-4			HALF UNION			
14	3		1019623	17020120090		CAP ASSY			
13	3		1019613	16020120070		NUT			
12	3		MS28775-013			"O" RING			
11	1		1019614	16020120080		BALL CHECK			
10	1		1019659	16020120490		BALL CHECK			
Ⓐ 9	1		1019663	16020120520		INDICATOR, HUMIDITY PLUG			
8	32		MS35338-82	74439003006		WASHER, LOCK			
7	32		AN960-C416	74468051006		WASHER, FLAT			
6	32		MS35275-80			SCREW, FIL HEAD SLOTTED			
5	1		1019631	16020120210		GASKET			
4	8		1019604	17020120060		SHEAR MOUNT ASSY			
3	1		1019606	16020120020		FRAME ASSY OPTICAL UNIT			
2	1		1019605	16020120010		COVER			
1	1		1019603	17020120050		CASE ASSY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019700	1019700

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020120030
DRAWN A.S. [illegible] DATE 4-10-64
CHECKED [illegible] 4-20-64
APPROVAL
APPROVAL [illegible] 4-26-64
NASA APPROVAL [illegible] 5-12-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STORAGE CONTAINER,
OPTICAL UNIT

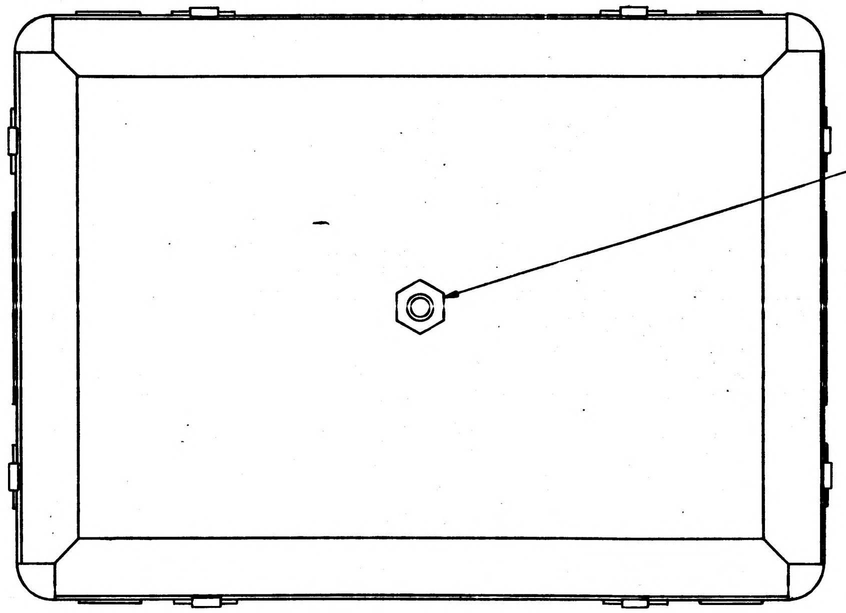
CODE IDENT NO.
SIZE E
NASA NUMBER 1019699
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

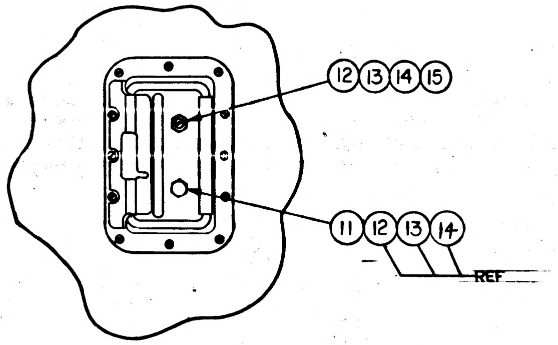
1019699

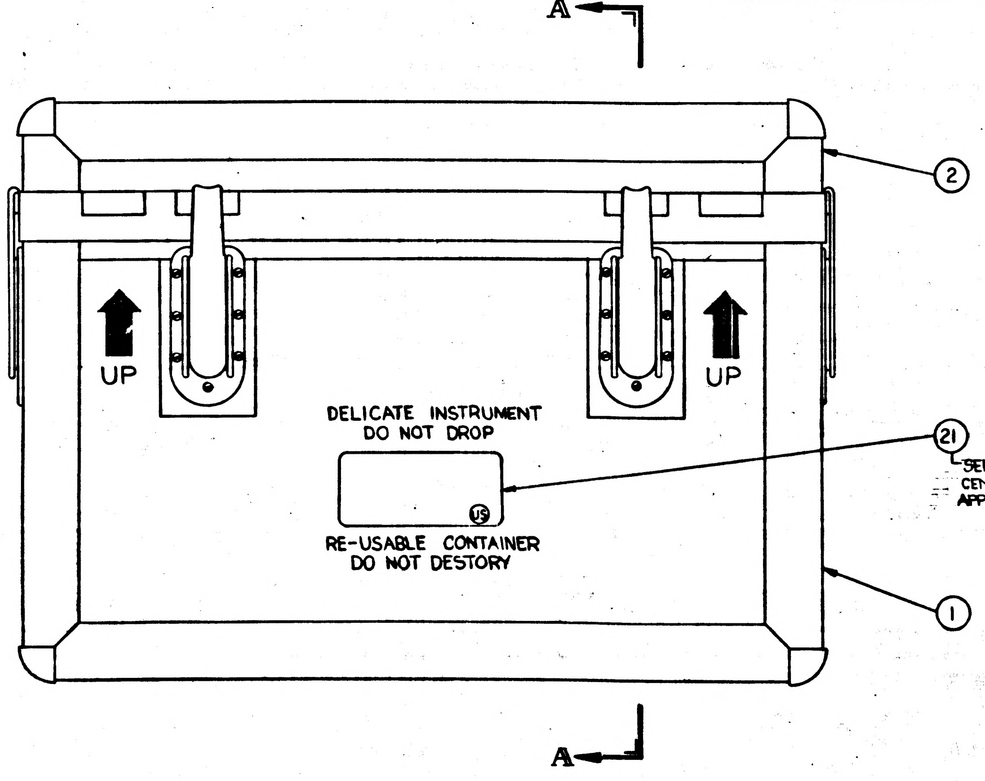
6696101

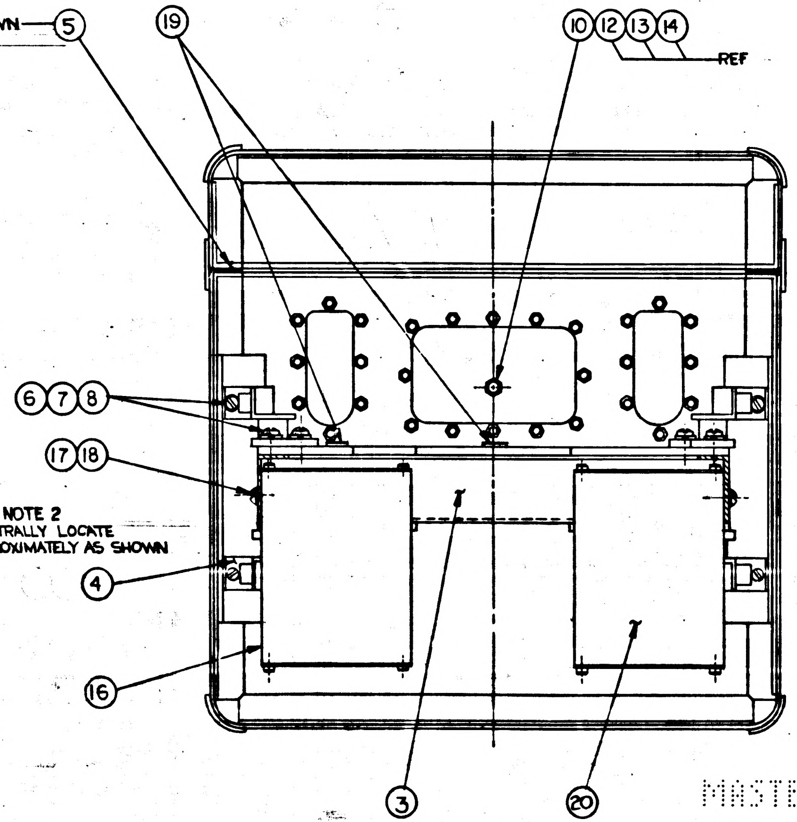
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERDRET DWG PER MIL-D-70327
2-CEMENT WITH EC-826 MIL-A-5092 TYPE III
3-IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019




12 13 14 15
11 12 13 14
REF


A
A
2
UP
UP
DELICATE INSTRUMENT
DO NOT DROP
21
RE-USABLE CONTAINER
DO NOT DESTORY
1


CEMENT TO ITEM 2 AS SHOWN
SEE NOTE 2
5
19
10 12 13 14
REF
6 7 8
17 18
SEE NOTE 2
CENTRALLY LOCATE
APPROXIMATELY AS SHOWN
4
16
3
20

SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
21	1		1019192	03386900755		PLATE, IDENTIFICATION			
20	1		1019600	17020120010		CONTAINER ASSY, SXT EYEPIECE			
19	3		1019655	16020120430		PAD			
18	4		MS35338-81	74439003005		WASHER, LOCK			
17	4		AN520C10-8			SCREW, ROUND HEAD SLOTTED			
16	1		1019601	17020120020		CONTAINER ASSY, SCT EYEPIECE			
15	1		AN816-4			HALF UNION			
14	3		1019623	17020120090		CAP ASSY			
13	3		1019613	16020120070		NUT			
12	3		MS28775-013			"O" RING			
11	1		1019614	16020120080		BALL CHECK			
10	1		1019659	16020120490		BALL CHECK			
9	1		PENDING	PENDING		HUMIDITY INDICATOR			
8	32		MS35338-82	74439003006		WASHER, LOCK			
7	32		AN960-C416	74468051006		WASHER, FLAT			
6	32		MS35275-80			SCREW, FIL HEAD SLOTTED			
5	1		1019631	16020120210		GASKET			
4	8		1019604	17020120060		SHEAR MOUNT ASSY			
3	1		1019606	16020120020		FRAME ASSY OPTICAL UNIT			
2	1		1019605	16020120010		COVER			
1	1		1019603	17020120050		CASE ASSY			

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1019700	1019700

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020120030
DRAWN A.S. [illegible] DATE 4-[illegible]
CHECKED [illegible] 4-[illegible]
APPROVAL
APPROVAL [illegible] 4-28-64
5-12-64
NASA APPROVAL [illegible] 5/11/64
MIT APPROVAL [illegible] 5/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE STORAGE CONTAINER, OPTICAL UNIT

CODE IDENT NO.
SIZE E
NASA NUMBER 1019699
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

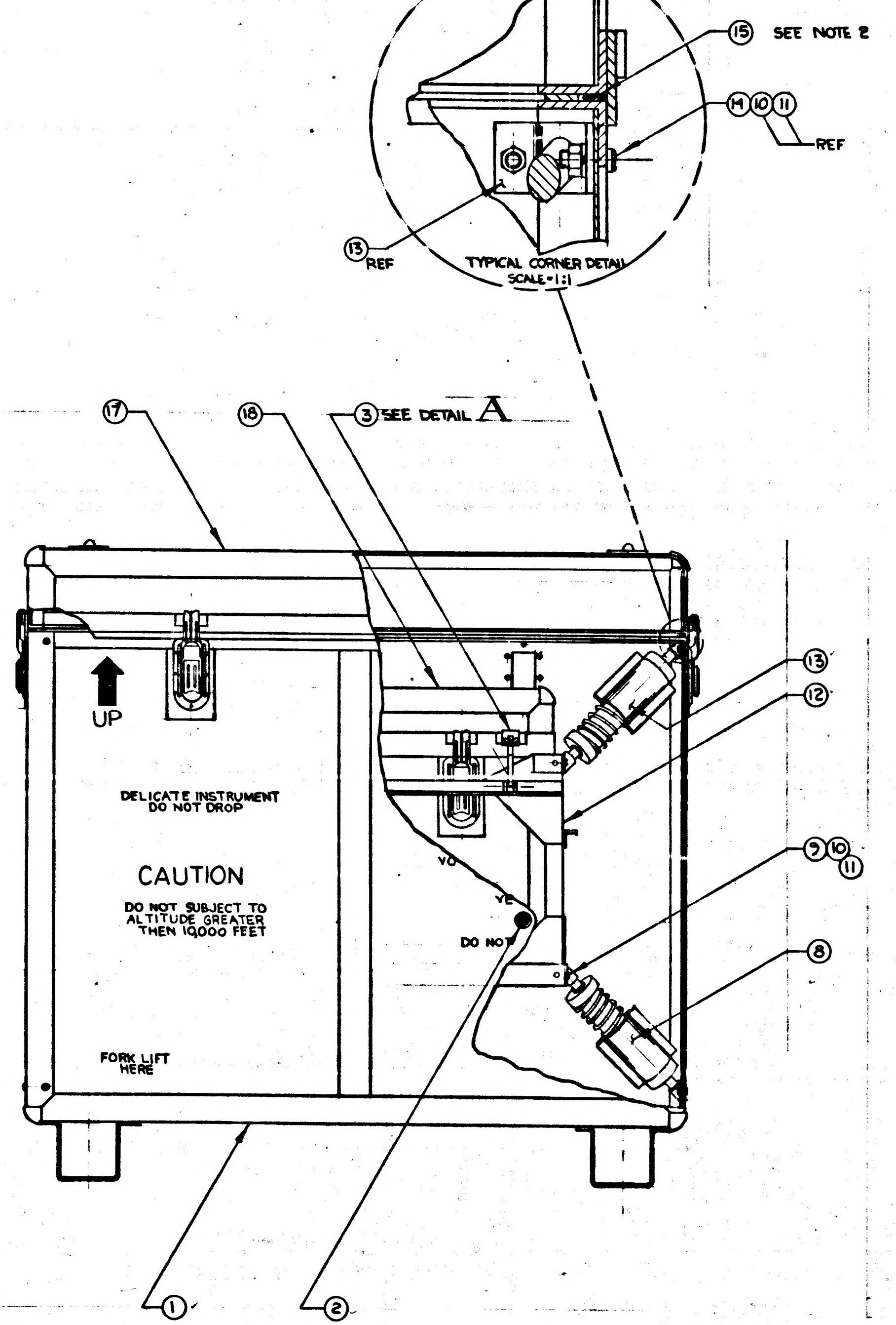
FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 03427 DATE 5-12-64

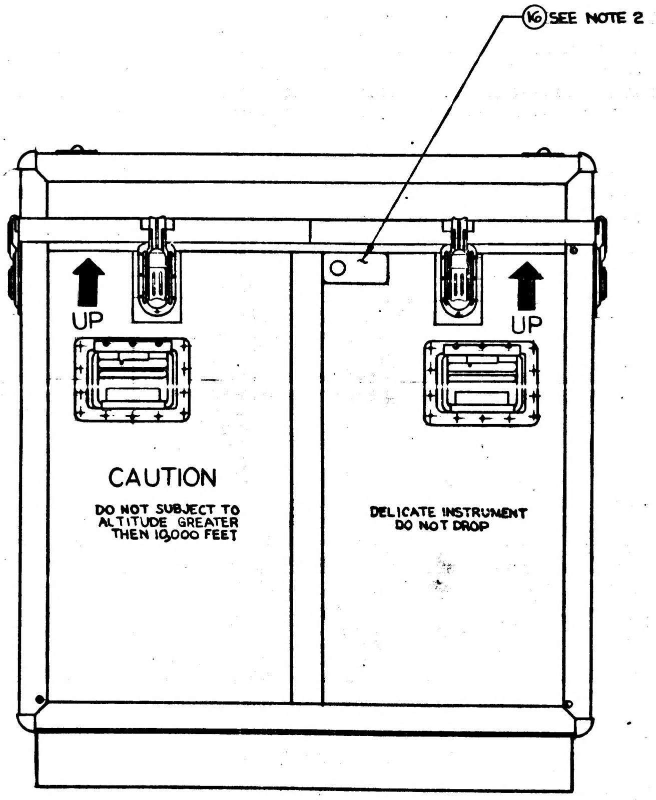
INCHES
0 1 2

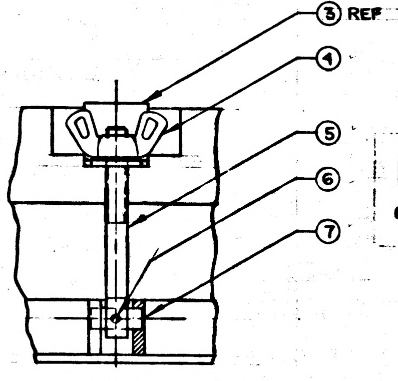
1019700

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. CEMENT ITEM NO. 16 TO ITEM NO. 1 AND ITEM NO. 15 TO ITEM NO. 17 USING EC826 CEMENT PER MIL-A-5092 TYPE III
3. IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019


⑮ SEE NOTE 2
⑭⑩⑪ REF
⑬ REF
TYPICAL CORNER DETAIL
SCALE=1:1
⑰
⑱
③ SEE DETAIL A
UP
DELICATE INSTRUMENT
DO NOT DROP
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10,000 FEET
FORK LIFT HERE
⑬
⑫
⑨⑩⑪
⑧
①
②


⑯ SEE NOTE 2
UP
UP
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10,000 FEET
DELICATE INSTRUMENT
DO NOT DROP


③ REF
④
⑤
⑥
⑦
DETAIL A TYPICAL
SCALE 1:1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08427 DATE 5-12-64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1		1019699	17020120030		STORAGE CONTAINER, OPTICAL UNIT			
17	1		1019661	17020120150		COVER, ASSEMBLY			
16	1		1019193	03386900756		PLATE, IDENTIFICATION			
15	1		1019618	16020120120		SEAL			
14	16		MS35216-71			SCREW, PAN HD, RECESSED			
13	4		1019608	17020120070		ISOLATOR ASSEMBLY, UPPER			
12	1		1019607	16020120030		FRAME, SUPPORT			
11	32		MS35690-410	61501051040		NUT, HEX			
10	32		MS35338-82	74390030006		WASHER, LOCK SPLIT			
9	16		MS35275-81	74455050081		SCREW, FIL HD, SLOTTED			
8	4		1019609	17020120080		ISOLATOR ASSEMBLY, LOWER			
7	4		1019634	16020120240		PIN, PIVOT			
6	4		MS171524	74008008094		PIN, ROLL			
5	4		1019633	16020120230		BOLT, EYE			
4	4		1019622-1	16020120160		NUT, WING			
3	4		1019635	16020120250		CLAMP			
2	1		1019662-1	16020120520		VENT, SNAP			
1	1		1019602	17020120040		CONTAINER ASSEMBLY, SHIPPING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020120000
DRAWN R CARROLL DATE 4-20-64
CHECKED B. Kyeski 4-27-64
APPROVAL
APPROVAL W. Wagner 4-28-64
NASA APPROVAL W. J. [illegible] 5-12-64
[illegible] 5/11/64
MIT APPROVAL [illegible]

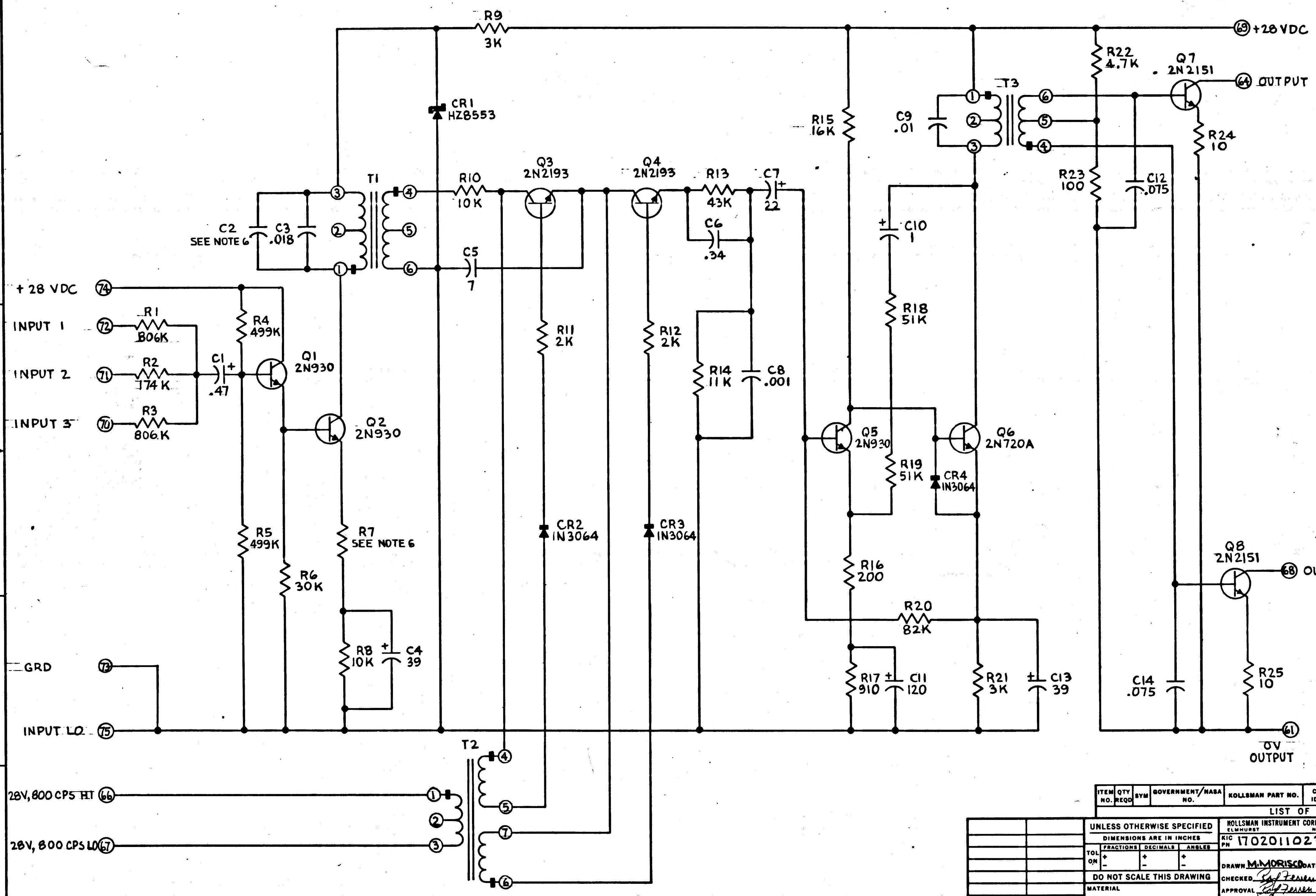
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHIPPING AND STORAGE
CONTAINER, OPTICAL UNIT

CODE IDENT NO.
SIZE E
NASA NUMBER 1019700
SCALE 1/4
WEIGHT
CALC ACTUAL
SHEET OF

ↄ	1026101

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE SHT 2 OF 2	11-6-63	
B		SEE SHT 2 OF 2	1-6-64	
C		SEE SHT 2 OF 2	3-14-64	
		TDRR 09086 Cate 5/27/64	5/27	


R9
3K
69 +28 VDC
CR1
HZ8553
T1
3
2
1
4
5
6
C2
SEE NOTE 6
C3
.018
R10
10K
C5
7
Q3
2N2193
Q4
2N2193
R13
43K
C7
22
C6
.34
+28 VDC 74
INPUT 1 72
INPUT 2 71
INPUT 3 70
R1
806K
R2
174 K
R3
806K
C1
.47
R4
499K
Q1
2N930
Q2
2N930
R5
499K
R6
30K
R7
SEE NOTE 6
R8
10K
C4
39
R11
2K
R12
2K
CR2
1N3064
CR3
1N3064
R14
11K
C8
.001
GRD 73
INPUT LO 75
T2
28V, 800 CPS HI 66
28V, 800 CPS LO 67
R15
16K
C9
.01
T3
C10
1
R18
51K
Q5
2N930
Q6
2N720A
R19
51K
CR4
1N3064
R16
200
R20
82K
R17
910
C11
120
R21
3K
C13
39
R22
4.7K
Q7
2N2151
64 OUTPUT
R24
10
R23
100
C12
.075
Q8
2N2151
68 OUTPUT
C14
.075
R25
10
61
0V
OUTPUT

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03545 **DATE** 10-1-63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230

DRAWN M.MORISCO DATE 8-2-63
CHECKED Raf Fesen 9-26-63
APPROVAL Raf Fesen 9-26-63
APPROVAL 9-27-63
NASA APPROVAL J Bernard
DJ Jeng 10-1-63
MIT APPROVAL 10-1-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. | SIZE D | NASA NUMBER 1019701
SCALE NONE | WEIGHT | CALC ACTUAL | SHEET 1 OF 2

MASTER

C 1019701

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		C5 WAS 1010438-003	11-6-63 ECP 99178	
B		R1 WAS 348K (1010364-739) R2 WAS 348K (1010364-739)	1-6-64 ECP 99174	
C		REVISED PER ECP 104961 TDRR 09086 DATE 5/27/64	3/14/64 JM	5/21/64

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.
6. VALUE TO BE DETERMINED PER ATP COMPONENT TO BE SUPPLIED FROM TABLE BELOW:

R7 NASA PART NO.	REMARKS	VALUE	C2 NASA PART NO.	REMARKS	VALUE
1006750-4		68 OHMS	1010359-17		1000 UUF
↑ 5		↑ 75	↑ 21		↑ 2200
6		82	23		3300
7		91	25		4700
8		100	26		5600
9		110	27		6800
10		120	↓ 28		↓ 8200
11		130	1010359-29		10000 UUF
↓ 12		↓ 150			
1006750-13		160 OHMS			

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
R1	1010374-20		RESISTOR	806K	±1%	1/8W
R2	1010364-681		↑	174K	↑	↑
R3	1010374-20			806K		
R4	1010364-769			499K	↓	↓
R5	1010364-769			499K	±1%	1/8W
R6	1006750-67			30K	±2%	1/4W
R7	↑	SEE NOTE 6			↑	↑
R8	56			10K		
R9	43			3K		
R10	56			10K		
R11	39			2K		
R12	39			2K		
R13	71			43K		
R14	57			11K		
R15	61			16K		
R16	15			200		
R17	31			910		
R18	73			51K		
R19	73			51K		
R20	↓ 78			82K		↓
R21	1006750-43			3K		1/4W
R22	1006760-48			4.7K	↓	1/2W
R23	1006750-8			100	±2%	1/4W
R24	1010389-8		↓	10	±1%	3W
R25	1010389-8		RESISTOR	10	±1%	3W
T1	1010276		TRANSFORMER			
T2	1010365		TRANSFORMER			
T3	1010276		TRANSFORMER			

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65		CAPACITOR	.47	±10%	35V
C2	1010359	SEE NOTE 6	↑		±20%	200V
C3	1010375-53			.018	±10%	100V
C4	1006755-13			39	↑	10V
C5	1010438-102			7.		6V
C6	1010279-226			.34	↓	35V
C7	1006755-29			2.2	±10%	20V
C8	1010359-17			.001	±20%	200V
C9	1010375-124			.01	±10%	300V
C10	1006755-69			1	↑	35V
C11	1006755-15			120		10V
C12	1010279-218			.075		35V
C13	1006755-13		↓	39	↓	10V
C14	1010279-218		CAPACITOR	.075	±10%	35V
CR1	1010372-24		DIODE	HZ8553		18V
CR2	1010370		↑	IN3064		
CR3	1010370		↓	IN3064		
CR4	1010370		DIODE	IN3064		
Q1	1010397-1		TRANSISTOR	2N930		
Q2	1010397-1		↑	2N930		
Q3	1010398-1			2N2193		
Q4	1010398-1			2N2193		
Q5	1010397-1			2N930		
Q6	1010357-1			2N720A		
Q7	1010269-2		↓	2N2151		
Q8			TRANSISTOR	2N2151		

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03545 DATE 10-1-63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED Rod Fever 9-24-63
APPROVAL Rod Fever 9-24-63
APPROVAL W. Burgess 9-27-63
NASA APPROVAL J. Barnard
MIT APPROVAL 10-1-63 10 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

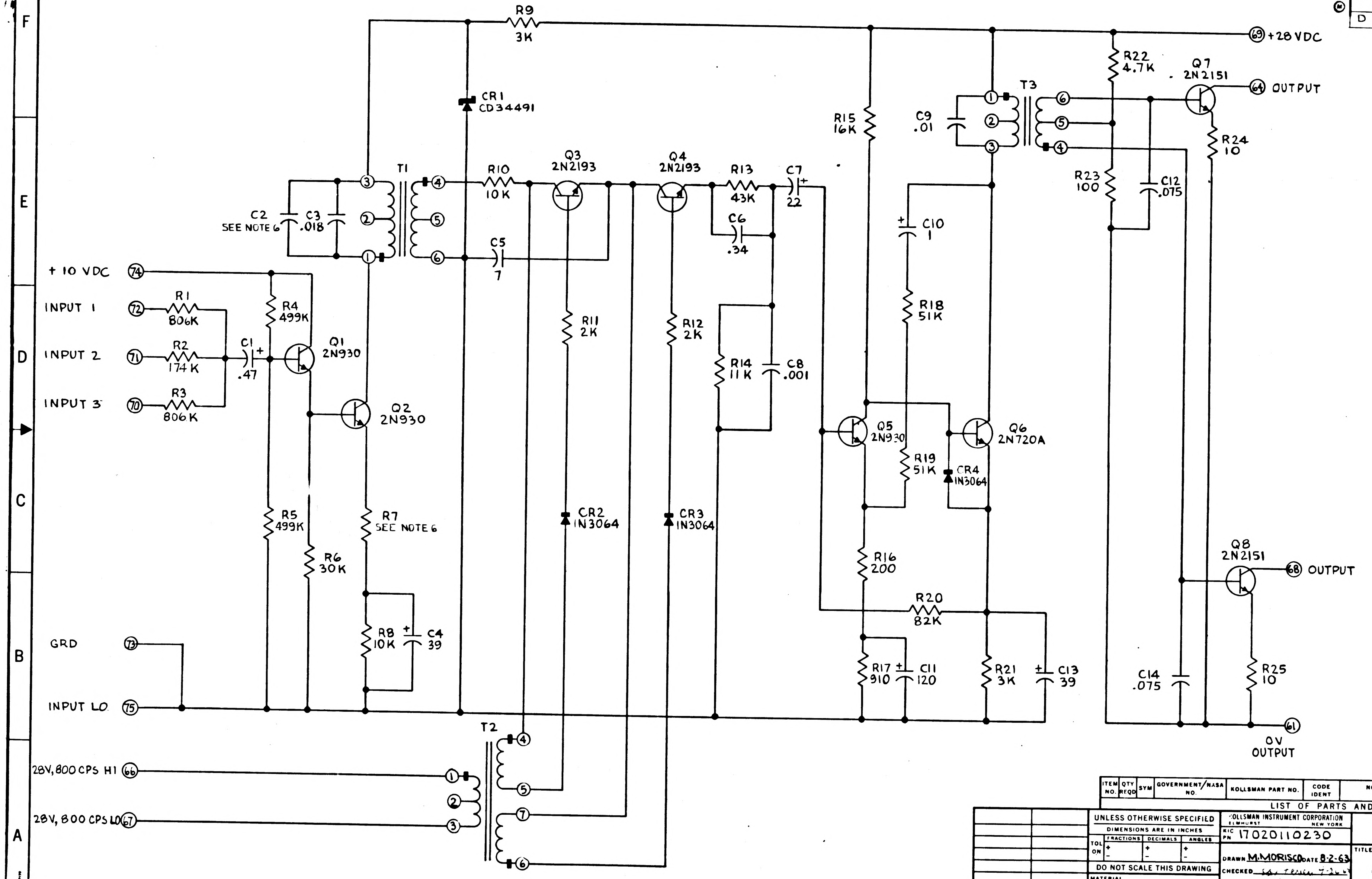
CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

MASTER

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

D | 1019701

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE SHT 2 OF 2	11-6-63	
B		SEE SHT 2 OF 2	1-6-64	
C		SEE SHT 2 OF 2 TDRR 09086 64	3-14-64 2/27	
D		REVISED PER ECP 09662 & TDRR 19234 DATE 2-24-65	6-12-65	



R9
3K
+28 VDC
CR1
CD34491
T1
R10
10K
Q3
2N2193
Q4
2N2193
R13
43K
C7
22
C2
SEE NOTE 6
C3
.018
C5
7
C6
.34
+10 VDC
INPUT 1
R1
806K
R4
499K
INPUT 2
R2
174 K
C1
.47
Q1
2N930
INPUT 3
R3
806K
Q2
2N930
R11
2K
R12
2K
R14
11 K
C8
.001
CR2
1N3064
CR3
1N3064
R5
499K
R6
30K
R7
SEE NOTE 6
R8
10K
C4
39
GRD
INPUT LO
T2
28V, 800 CPS HI
28V, 800 CPS LO
R15
16K
C9
.01
T3
R22
4.7K
Q7
2N2151
OUTPUT
R24
10
R23
100
C12
.075
C10
1
R18
51K
Q5
2N930
Q6
2N720A
R19
51K
CR4
1N3064
R16
200
R20
82K
R17
910
C11
120
R21
3K
C13
39
C14
.075
Q8
2N2151
OUTPUT
R25
10
0V
OUTPUT

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1017404	1016949
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED 7-26-63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019701 D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4 REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.
6. VALUE TO BE DETERMINED PER ATP COMPONENT TO BE SUPPLIED FROM TABLE BELOW:

R7 NASA PART NO.	REMARKS	VALUE	C2 NASA PART NO.	REMARKS	VALUE
100 713 -4		68 OHMS	1001722 -17		1000 UUF
↑ 5		75 ↑	↑ 21		2200 ↑
6		82	23		3300
7		91	25		4700
8		100	26		5600
9		110	27		6800
10		120	↓ 28		8200 ↓
11		130	1001722 -29		10000 UUF
↓ 12		150 ↓			
1001 713 -13		160 OHMS			

D 1019701

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		C5 WAS 1010438-003	ECP 94178	
B		R1 WAS 348K (1010364-739) R2 WAS 348K (1010364-739)	ECP 94174	
C		REVISED PER ECP 104961 TDRR DATE	3/4/64	
D		REVISED PER ECP 109662 & TDRR 19234 DATE 2-24-65	6-12-65	

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
R1	1001715 -20		RESISTOR	806 K	±1%	1/8 W
R2	1001705 -681		↑	174 K	↑	↑
R3	1001715 -20			806K		
R4	1001705 -769			499K	↓	↓
R5	1001705 -769			499K	±1%	1/8 W
R6	1001713 -67			30K	±2%	1/4 W
R7	↑	SEE NOTE 6			↑	↑
R8	56			10K		
R9	43			3K		
R10	56			10K		
R11	39			2K		
R12	39			2K		
R13	71			43K		
R14	57			11K		
R15	61			16K		
R16	15			200		
R17	31			910		
R18	73			51K		
R19	73			51K		
R20	↓ 78			82K		↓
R21	1001713 -43			3K		1/4 W
R22	1001716 -48			4.7K	↓	1/2 W
R23	1001713 -8			100	±2%	1/4 W
R24	1001714 -8		↓	10	±1%	3 W
R25	1001714 -8		RESISTOR	10	±1%	3 W
T1	1001733		TRANSFORMER			
T2	1001718		TRANSFORMER			
T3	1001733		TRANSFORMER			

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
C1	1001706 -65		CAPACITOR	.47	±10%	35V
C2	1001722	SEE NOTE 6	↑		±10%	200V
C3	1001704 -53			.018	±10%	100V
C4	1001706 -13			39	↑	10V
C5	1001717 -102			7		6V
C6	1001723 -226			.34		35V
C7	1001706 -29			2.2		20V
C8	1001722 -17			.001		200V
C9	1001704 -124			.01		300V
C10	1001706 -69			1		35V
C11	1001706 -15			120		10V
C12	1001723 -218			.075		35V
C13	1001706 -13		↓	39	↓	10V
C14	1001723 -218		CAPACITOR	.075	±10%	35V
CR1	1001749 -24		DIODE	CD34491		18V
CR2	1001708		↑	IN 3064		
CR3	1001708		↓	IN 3064		
CR4	1001708		DIODE	IN3064		
Q1	1001720-001		TRANSISTOR	2N930		
Q2	1001720-001		↑	2N930		
Q3	1001719-001			2N2193		
Q4	1001719-001			2N2193		
Q5	1001720-001			2N930		
Q6	1001712-1			2N720A		
Q7	1001802-002		↓	2N2151		
Q8			TRANSISTOR	2N2151		

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ -	+ -	+ -

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230

DRAWN M. MORISCO DATE 8-2-63
CHECKED
APPROVAL
APPROVAL 7-27-63
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

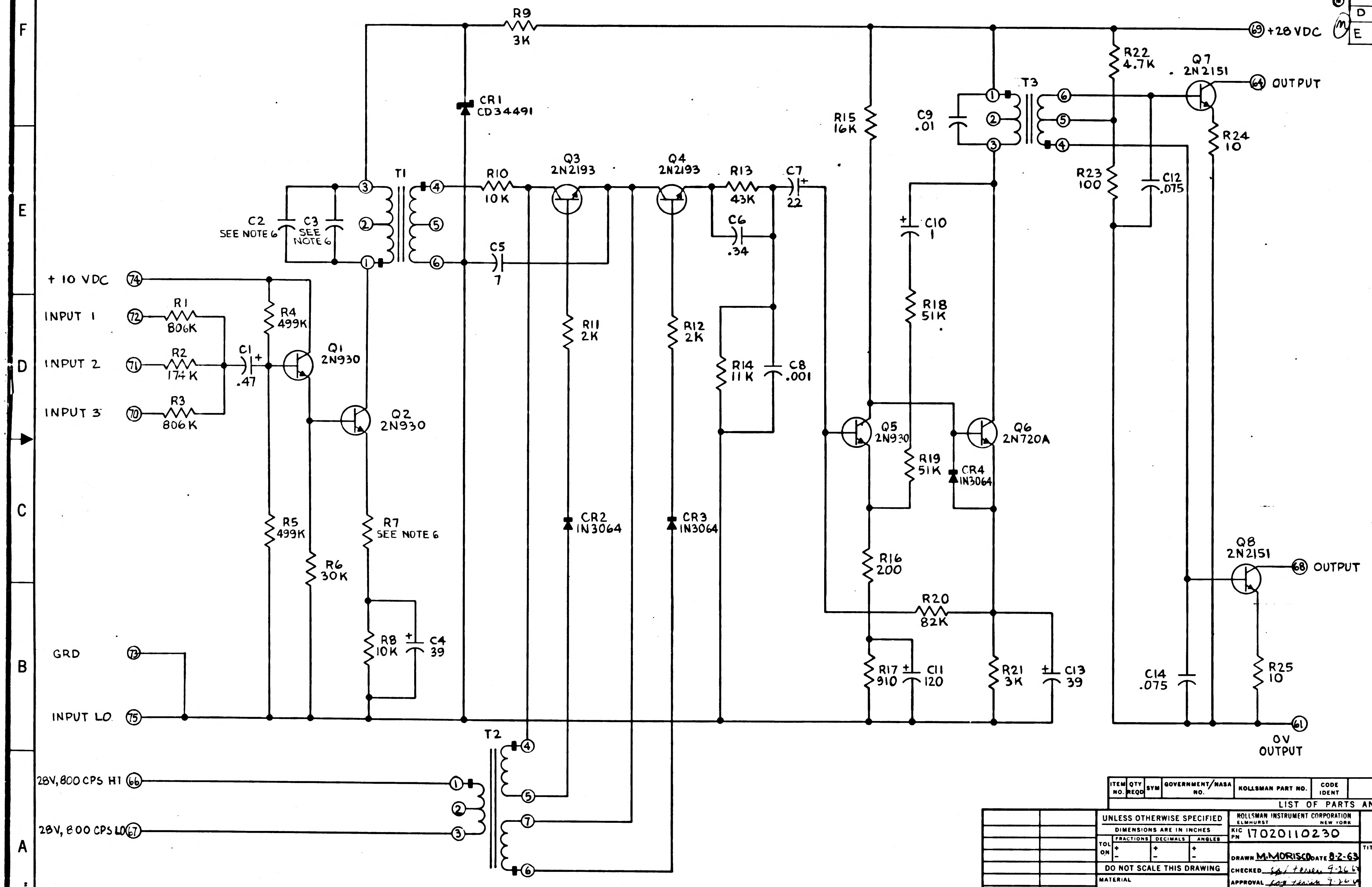
CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019701 D

K-E

1019701 E

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE SHT 2 OF 2	11-6-63	
B		SEE SHT 2 OF 2	1-6-64	
C		SEE SHT 2 OF 2 TDRR 09086	3-14-64 3/27	
D		REVISED PER ECP 109662 & TDRR 19234 DATE 2-24-65	6-12-65	JD
E		REVISED PER ECO 109525 TDRR 24443 DATE 11-30-65	HEB 12-10-65	HDB 12/15-65


R9 3K
+28 VDC
CR1 CD34491
R22 4.7K
Q7 2N2151
OUTPUT
T3
R15 16K
C9 .01
R24 10
T1
R10 10K
Q3 2N2193
Q4 2N2193
R13 43K
C7 22
R23 100
C12 .075
C2 SEE NOTE 6
C3 SEE NOTE 6
C6 .34
C10 1
C5 7
+10 VDC
INPUT 1
R1 806K
R4 499K
R11 2K
R12 2K
R18 51K
INPUT 2
R2 174K
C1 .47
Q1 2N930
R14 11K
C8 .001
INPUT 3
R3 806K
Q2 2N930
Q5 2N930
Q6 2N720A
R19 51K
CR4 1N3064
R5 499K
R7 SEE NOTE 6
CR2 1N3064
CR3 1N3064
R6 30K
Q8 2N2151
OUTPUT
R16 200
R20 82K
R8 10K
C4 39
GRD
R17 910
C11 120
R21 3K
C13 39
C14 .075
R25 10
INPUT LO
0V OUTPUT
T2
28V, 800 CPS HI
28V, 800 CPS LO
74
72
71
70
73
75
66
67
69
64
68
61

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230

DRAWN M. MORISCO DATE 8-2-63
CHECKED 9-26-63
APPROVAL 9-26-63
APPROVAL 9-27-63
NASA APPROVAL
MIT APPROVAL 10-1-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019701 E

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4 REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.
6. VALUE TO BE DETERMINED PER ATP COMPONENT TO BE SUPPLIED FROM TABLE BELOW:

R7

NASA PART NO.	REMARKS	VALUE
100 713 -4		68 OHMS
5		75
6		82
7		91
8		100
9		110
10		120
11		130
12		150
1001713 -13		160
10017 13 - 1		51
1001713 - 2		56
1001716 - 109		33
1001716 - 111		39
1001716 - 113		47 OHMS

C2

NASA PART NO.	REMARKS	VALUE
1001722 -17		1000 UUF
21		2200
23		3300
25		4700
26		5600
27		6800
28		8200
1001722 -29		10000 UUF

C3

NASA PART NO.	REMARKS	VALUE
1001704-52		.015 UF
1001704-53		.018 UF

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
A		C5 WAS 1010438-003	11-6-63 ECP 99178	
B		R1 WAS 348K (1010364-739) R2 WAS 348K (1010364-739)	1-6-64 ECP 99174	
C		REVISED PER ECP 104961 TDRR DATE	3/14/64 J.M.	
D		REVISED PER ECP 109662 & TDRR 19234 DATE 2-24-65	6-12-65	
E		REVISED PER ECP 109525 TDRR 24443 DATE 11-30-65	HEB 12-10-65	

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
R1	1001715 -20		RESISTOR	806 K	±1%	1/8 W
R2	1001705 -681			174 K		
R3	1001715 -20			806K		
R4	1001705 -769			499K		
R5	1001705 -769			499K	±1%	1/8 W
R6	1001713 -67			30K	±2%	1/4 W
R7		SEE NOTE 6				
R8	56			10 K		1/4 W
R9	43			3K		
R10	56			10K		
R11	39			2K		
R12	39			2K		
R13	71			43K		
R14	57			11K		
R15	61			16K		
R16	15			200		
R 7	31			910		
R18	73			51K		
R19	73			51K		
R20	78			82K		
R21	1001713 -43			3K		1/4 W
R22	1001716 -48			4.7K		1/2 W
R23	1001713 -8			100	±2%	1/4 W
R24	1001714 -8			10	±1%	3 W
R25	1001714 -8		RESISTOR	10	±1%	3 W
T1	1001733		TRANSFORMER			
T2	1001718		TRANSFORMER			
T3	1001733		TRANSFORMER			

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
C1	1001706-65		CAPACITOR	.47	±10%	35V
C2	1001722	SEE NOTE 6			±10%	200V
C3	1001704	SEE NOTE 6			±10%	100V
C4	1001706 -13			39		10V
C5	1001717 -102			7.		6V
C6	1001723 -226			.34		35V
C7	1001706 -29			2.2		20V
C8	1001722 -17			.001		200V
C9	1001704 -124			.01		300V
C10	1001706 -69			1		35V
C11	1001706 -15			120		10V
C12	1001723 -218			.075		35V
C13	1001706 - 13			39		10V
C14	1001723 -218		CAPACITOR	.075	±10%	35V
CR1	1001749 - 24		DIODE	CD34491		18V
CR2	1001708			IN 3064		
CR3	1001708			IN 3064		
CR4	1001708		DIODE	IN3064		
Q1	1001720-001		TRANSISTOR	2N930		
Q2	1001720-001			2N930		
Q3	1001719-001			2N2193		
Q4	1001719-001			2N2193		
Q5	1001720-001			2N930		
Q6	1001712-1			2N720A		
Q7	1001802-002			2N2151		
Q8			TRANSISTOR	2N2151		

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M.MORISCO DATE 8-2-63
CHECKED
APPROVAL
APPROVAL 9-17-63
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

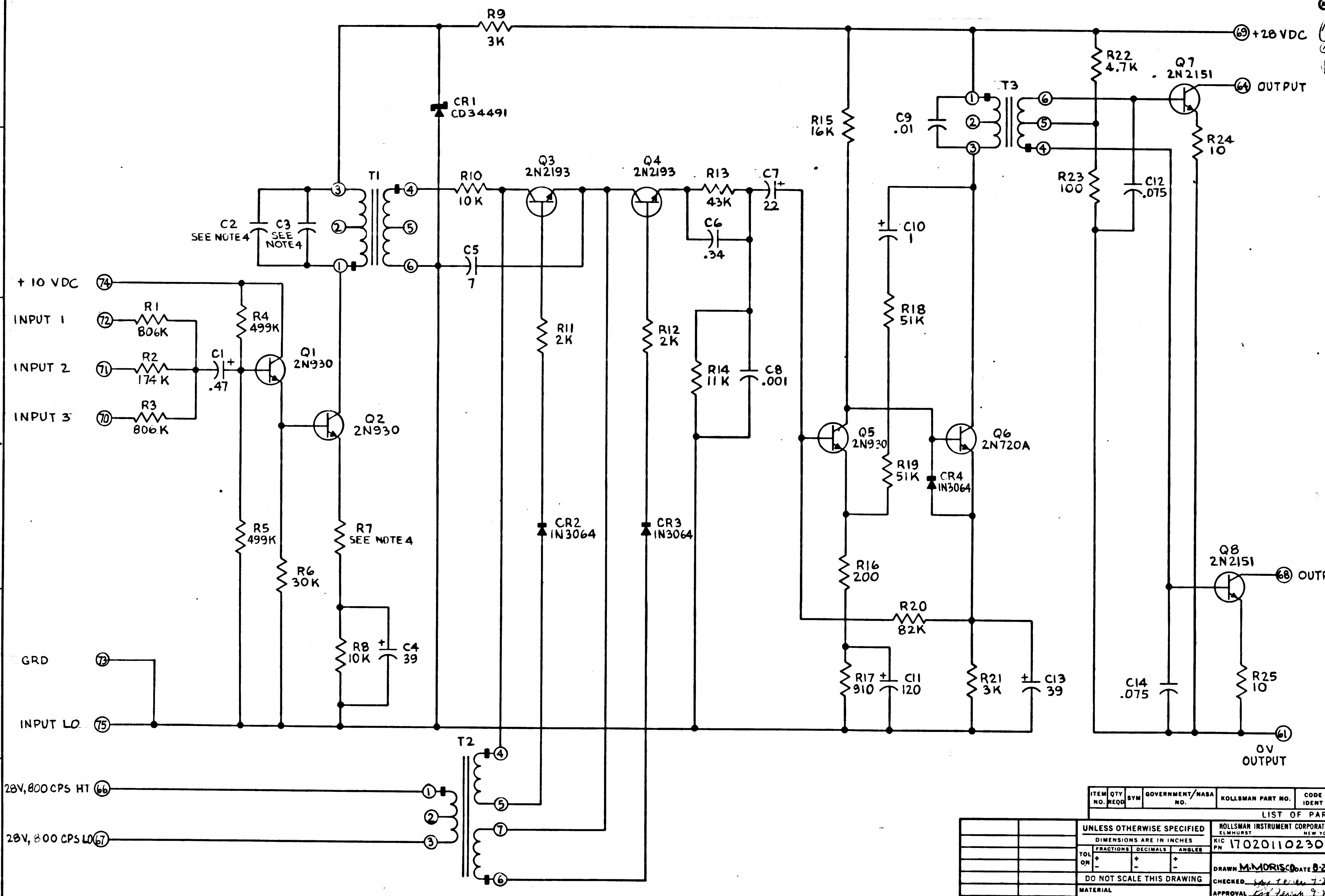
TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

MASTER

1019701 E

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE SHT 2 OF 2	11-6-63	
B		SEE SHT 2 OF 2	1-6-64	
C		SEE SHT 2 OF 2 TDRR 09086 [illegible] 5/2 '64	3-14-64 3/27	
D		REVISED PER ECO 09662 & TDRR 19234 DATE 2-24-65	6-12-65	
E		REVISED PER ECO 109525 TDRR 24443 DATE 11-30-65	HEB 12-10-65	HDB 12-15-65
F		REVISED PER ECO 114420 TDRR 25637 DATE 1-25-66	3-7-66	HDB 3-9-66
G		REVISED PER ECO 116111 TDRR G 28244 DATE 4-26-66	4-27-66 ALR	5-2-66


R9
3K
69 +28 VDC
CR1
CD34491
T1
R10
10K
Q3
2N2193
Q4
2N2193
R13
43K
C7
22
C6
.34
C2
SEE NOTE 4
C3
SEE NOTE4
C5
7
+ 10 VDC 74
INPUT 1 72
INPUT 2 71
INPUT 3 70
R1
806K
R2
174 K
R3
806 K
C1
.47
R4
499K
Q1
2N930
Q2
2N930
R5
499K
R6
30K
R7
SEE NOTE 4
R8
10K
C4
39
R11
2K
R12
2K
CR2
1N3064
CR3
1N3064
R14
11 K
C8
.001
GRD 73
INPUT LO 75
T2
28V, 800 CPS HI 66
28V, 800 CPS LO 67
R15
16K
C9
.01
T3
C10
1
R18
51K
Q5
2N930
R19
51K
CR4
1N3064
Q6
2N720A
R16
200
R20
82K
R17
910
C11
120
R21
3K
C13
39
R22
4.7K
Q7
2N2151
64 OUTPUT
R24
10
R23
100
C12
.075
Q8
2N2151
68 OUTPUT
C14
.075
R25
10
61
0V
OUTPUT

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED [illegible] 9-26-63
APPROVAL [illegible] 9-26-63
APPROVAL [illegible] 9-26-63
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 10-1-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019701 G

NOTES:
. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. PARTS LIST TO BE FOR REFERENCE ONLY.
. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS.
. VALUES TO BE DETERMINED BY TEST SEE CHART.

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
C1	1001706-65		CAPACITOR	.47	±10%	35V
C2	1001722	SEE NOTE 4			±10%	200V
C3	1001704	SEE NOTE 4			±10%	100V
C4	1001706-13			39		10V
C5	1001717-102			7.		6V
C6	1001723-226			.34		35V
C7	1001706-29			2.2		20V
C8	1001722-17			.001		200V
C9	1001704-124			.01		300V
C10	1001706-69			1		35V
C11	1001706-15			120		10V
C12	1001723-218			.075		35V
C13	1001706-13			39		10V
C14	1001723-218		CAPACITOR	.075	±10%	35V
CR1	1001749-24		DIODE	CD34491		18V
CR2	1001708			IN3064		
CR3	1001708			IN3064		
CR4	1001708		DIODE	IN3064		
Q1	1001720-001		TRANSISTOR	2N930		
Q2	1001720-001			2N930		
Q3	1001719-001			2N2193		
Q4	1001719-001			2N2193		
Q5	1001720-001			2N930		
Q6	1001712-1			2N720A		
Q7	1001802-002			2N2151		
Q8			TRANSISTOR	2N2151		

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
R1	1001715-20		RESISTOR	806K	±1%	1/8 W
R2	1001705-681			174K		
R3	1001715-20			806K		
R4	1001705-769			499K		
R5	1001705-769			499K	±1%	1/8 W
R6	1001713-67			30K	±2%	1/4 W
R7		SEE NOTE 4				
R8	56			10K		1/4 W
R9	43			3K		
R10	56			10K		
R11	39			2K		
R12	39			2K		
R13	71			43K		
R14	57			11K		
R15	61			16K		
R16	15			200		
R17	31			910		
R18	73			51K		
R19	73			51K		
R20	78			82K		
R21	1001713-43			3K		1/4 W
R22	1001716-48			4.7K		1/2 W
R23	1001713-8			100	±2%	1/4 W
R24	1001714-8			10	±1%	3 W
R25	1001714-8		RESISTOR	10	±1%	3 W
T1	1001733		TRANSFORMER			
T2	1001718		TRANSFORMER			
T3	1001733		TRANSFORMER			

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		C5 WAS 1010438-003	11-6-63 ECP 99178	
B		R1 WAS 348K (1010364-739) R2 WAS 348K (1010364-739)	1-6-64 ECP 99174	
C		REVISED PER ECP 104961 TDRR [illegible] DATE [illegible]64	3/16/64 JM	FFP 5/21/64
D		REVISED PER ECP 109662 & TDRR 19234 DATE 2-24-65	6-12-65	JD
E		REVISED PER ECP 109525 TDRR 24443 DATE 11-30-65	HEB 12-10-65	DB 12-15-65
F		REVISED PER ECO 114420 TDRR 25637 DATE 1-25-66	JM 3-7-66	DB 3-9-66
G		REVISED PER ECO 116111 TDRR 28244 DATE 4-26-66	4-27-66 ALR	JF 5-2-66

SELECTION CHARTS

C2

PART NO.	VALUE
1001722-17	1000 UUF
1001722-21	2200 UUF
1001722-23	3300 UUF
1001722-25	4700 UUF
1001722-26	5600 UUF
1001722-27	6800 UUF
1001722-28	8200 UUF
1001722-29	10,000 UUF
1001722-9	220 UUF
1001722-13	470 UUF
1001722-1	47 UUF
1001722-3	68 UUF
1001722-4	82 UUF
1001722-5	100 UUF

R7

PART NO.	VALUE
1001713-4	68
1001713-5	75
1001713-6	82
1001713-7	91
1001713-8	100
1001713-9	110
1001713-10	120
1001713-11	130
1001713-12	150
1001713-13	160
1001713-1	51
1001713-2	56
1001716-109	33
1001716-111	39
1001716-113	47

C3

PART NO.	VALUE
1001704-52	.015 UF
1001704-53	.018 UF
1001704-51	.012 UF

REFERENCE DRAWINGS:
1. AMPLIFIER, MOTOR DRIVE ASSY 1017404-000
2. AMPLIFIER, MOTOR DRIVE ASSY 1017404-011

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED
APPROVAL
APPROVAL 9-27-63
NASA APPROVAL
MIT APPROVAL

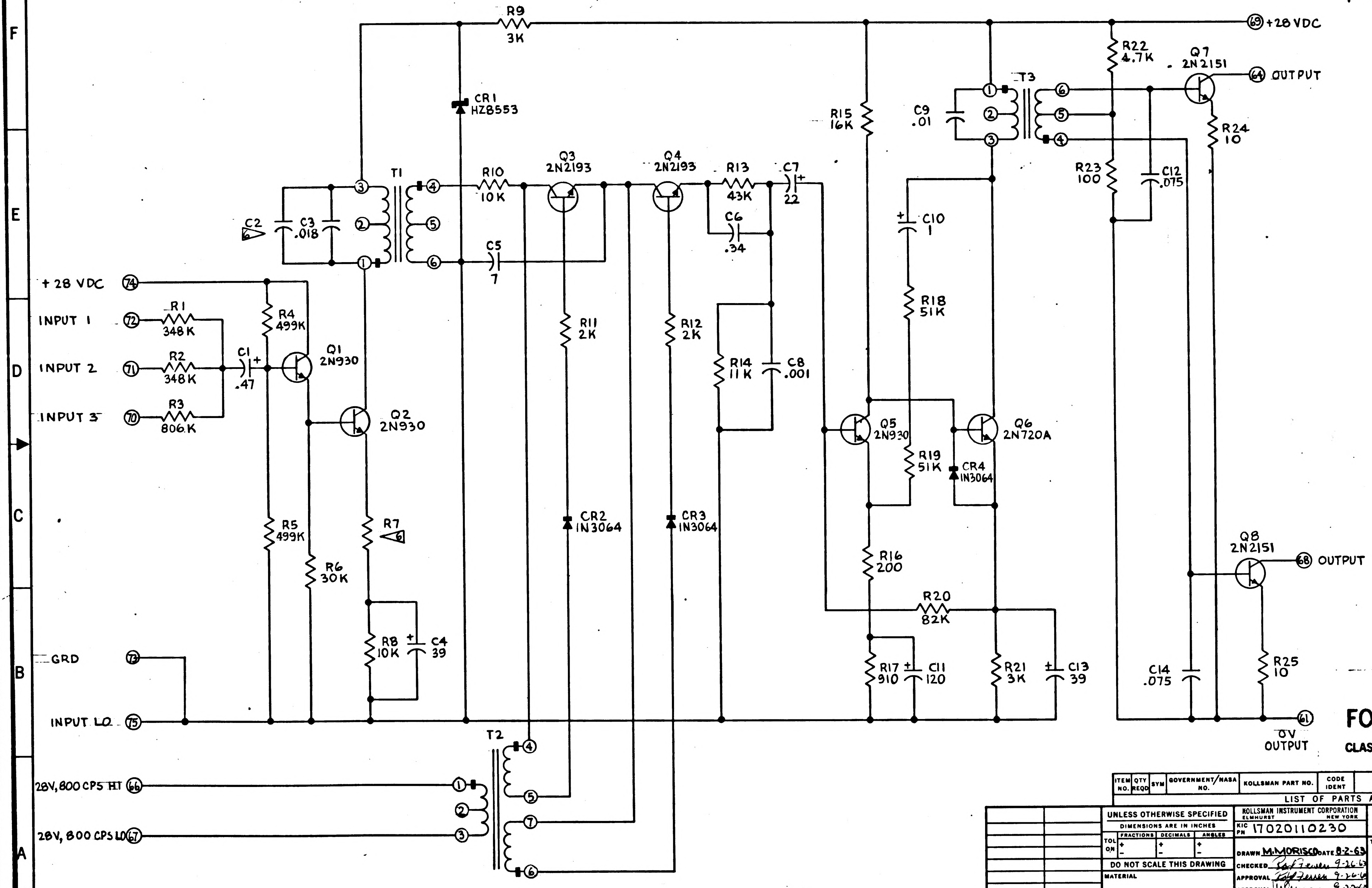
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019701
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019701

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL


+28 VDC
R9
3K
69 +28 VDC
CR1
HZ8553
R22
4.7K
Q7
2N2151
64 OUTPUT
R15
16K
C9
.01
T3
1
2
3
6
5
4
R24
10
R23
100
C12
.075
T1
3
2
1
4
5
6
R10
10K
Q3
2N2193
Q4
2N2193
R13
43K
C7
22
C6
.34
C10
1
C2
C3
.018
C5
7
+ 28 VDC 74
INPUT 1 72
INPUT 2 71
INPUT 3 70
R1
348K
R2
348K
R3
806K
C1
.47
R4
499K
Q1
2N930
Q2
2N930
R11
2K
R12
2K
R18
51K
R14
11K
C8
.001
Q5
2N930
Q6
2N720A
R19
51K
CR4
1N3064
R5
499K
R6
30K
R7
CR2
1N3064
CR3
1N3064
Q8
2N2151
68 OUTPUT
R16
200
R20
82K
R8
10K
C4
39
GRD 73
R17
910
C11
120
R21
3K
C13
39
C14
.075
R25
10
INPUT LO 75
61
0V
OUTPUT
T2
4
5
7
6
1
2
3
28V, 800 CPS HI 66
28V, 800 CPS LO 67

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03545 **DATE** 10-1-63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED 9-26-63
APPROVAL 9-26-63
APPROVAL 9-27-63
NASA APPROVAL
10-1-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. SIZE D NASA NUMBER 1019701
SCALE NONE WEIGHT CALC ACTUAL SHEET 1 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019701

1019701

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.
6. VALUE TO BE DETERMINED PER ATP
COMPONENT TO BE SUPPLIED FROM TABLE BELOW:

R7

NASA PART NO.	REMARKS	VALUE
1006750-4		68 OHMS
5		75
6		82
7		91
8		100
9		110
10		120
11		130
12		150
1006750-13		160 OHMS

C2

NASA PART NO.	REMARKS	VALUE
1010359-17		1000 UUF
21		2200
23		3300
25		4700
26		5600
27		6800
28		8200
1010359-29		10000 UUF

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-739		RESISTOR	348K	±1%	1/8 W
R2	1010364-739			348K		
R3	1010374-20			806K		
R4	1010364-769			499K		
R5	1010364-769			499K	±1%	1/8 W
R6	1006750-67			30K	±2%	1/4 W
R7						
R8	56			10K		
R9	43			3K		
R10	56			10K		
R11	39			2K		
R12	39			2K		
R13	71			43K		
R14	57			11K		
R15	61			16K		
R16	15			200		
R17	31			910		
R18	73			51K		
R19	73			51K		
R20	78			82K		
R21	1006750-43			3K		1/4 W
R22	1006760-48			4.7K		1/2 W
R23	1006750-8			100	±2%	1/4 W
R24	1010389-8			10	±1%	2 W
R25	1010389-8		RESISTOR	10	±1%	2 W
T1	1010276		TRANSFORMER	D1-T276		
T2	1010365		TRANSFORMER	D1-T278		
T3	1010276		TRANSFORMER	D1-T276		

REF DESIG	GOVERNMENT/ NASA NO.	REMARKS	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65		CAPACITOR	.47	±10%	35V
C2	1010359					200V
C3	1010375-53			.018		100V
C4	1006755-13			39		10V
C5	1010438-003			7.		6V
C6	1010279-226			.34		35V
C7	1006755-29			2.2		20V
C8	1010359-17			.001		200V
C9	1010375-124			.01		300V
C10	1006755-69			1		35V
C11	1006755-15			120		10V
C12	1010279-218			.075		35V
C13	1006755-13			39		10V
C14	1010279-218		CAPACITOR	.075	±10%	35V
CR1	1010372-24		DIODE	HZ8553		18V
CR2	1010370			IN3064		
CR3	1010370			IN3064		
CR4	1010370		DIODE	IN3064		
Q1	1010397		TRANSISTOR	2N930		
Q2	1010397			2N930		
Q3	1010398-1			2N2193		
Q4	1010398-1			2N2193		
Q5	1010397			2N930		
Q6	1010357			2N720A		
Q7	1010269-2			2N2151		
Q8			TRANSISTOR	2N2151		

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03545 **DATE** 10-1-63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1017404	1016949
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110230
DRAWN M. MORISCO DATE 8-2-63
CHECKED Rod Ferren 9-24-63
APPROVAL Rod Ferren 9-24-63
APPROVAL W. Burns 9-27-63
NASA APPROVAL J Barnard
D J Graf 10-1-63
MIT APPROVAL 10-1-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019701
SCALE NONE WEIGHT CALC ACTUAL SHEET 2 OF 2

MASTER

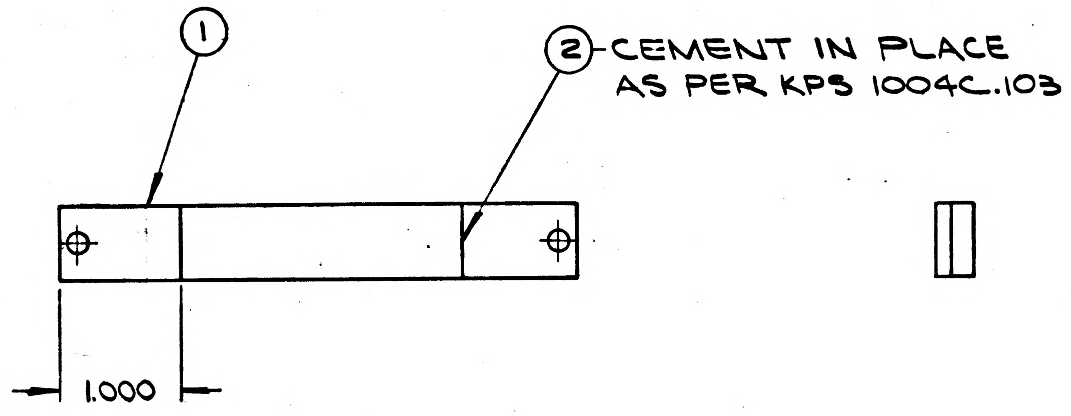
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1019701

1019702

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2-IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART Nº; REV. LETTER & MFRS SYM (KIC)



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03652 **DATE** 10/8/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		1019055	16020110430		CUSHION			
1	1		1019056	16020110440		RETAINING STRIP			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .015	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110240
DRAWN Rindzuner DATE 9-24-63
CHECKED STRAMPFER 9-24-63
APPROVAL
APPROVAL R. Severson 10/8/63
NASA APPROVAL W J Rhine 10-8-63
W.[illegible] 10-7-63
MIT APPROVAL W.[illegible] 8Oct63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINING STRIP
ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019702
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

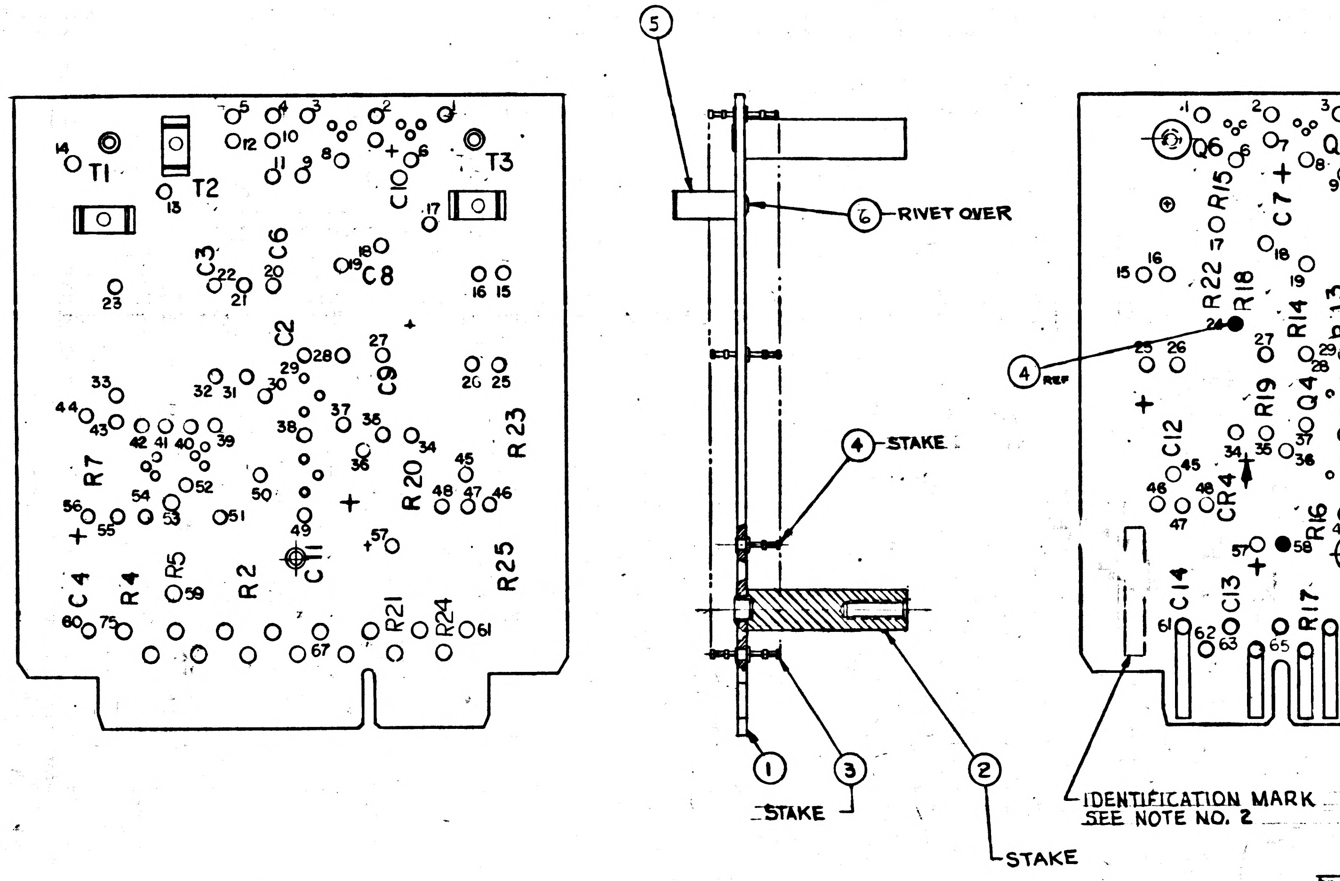
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019703

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327
2. IDENTIFY IN ACCORDANCE WITH ND1002019; NASA PART NO, REV. LETTER & MFRS SYM (KIC)



5
6 RIVET OVER
4 STAKE
4 REF
1
3
2
STAKE
STAKE
IDENTIFICATION MARK SEE NOTE NO. 2
T1
T2
T3
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
Q1
Q2
Q3
Q4
Q5
Q6
CR1
CR2
CR3
CR4

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03652 DATE 10/8/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	3		MS16535-24	74 45401 2024		RIVET, TUBULAR OVAL HD			
5	3			74 41407 4001		HOLDER, COMPONENT			
4	2		1000252	68 10101 2510		TERMINAL, STUD			
3	73			68 10101 2518		TERMINAL, STUD			
2	3		1019051	16020110390		SPACER, SLEEVE			
1	1		1019060	16020110480		PRINTED CIRCUIT BOARD			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017404	1016494

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± —; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110250

DRAWN B. Pruce DATE 9-12-63
CHECKED 9/20/63
APPROVAL Ray Ferris 9/30/63
APPROVAL 9-31-63
NASA APPROVAL W. J. 10-8-63
10-7-63
MIT APPROVAL 9/30/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BOARD, TERMINAL, ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 1019703
SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

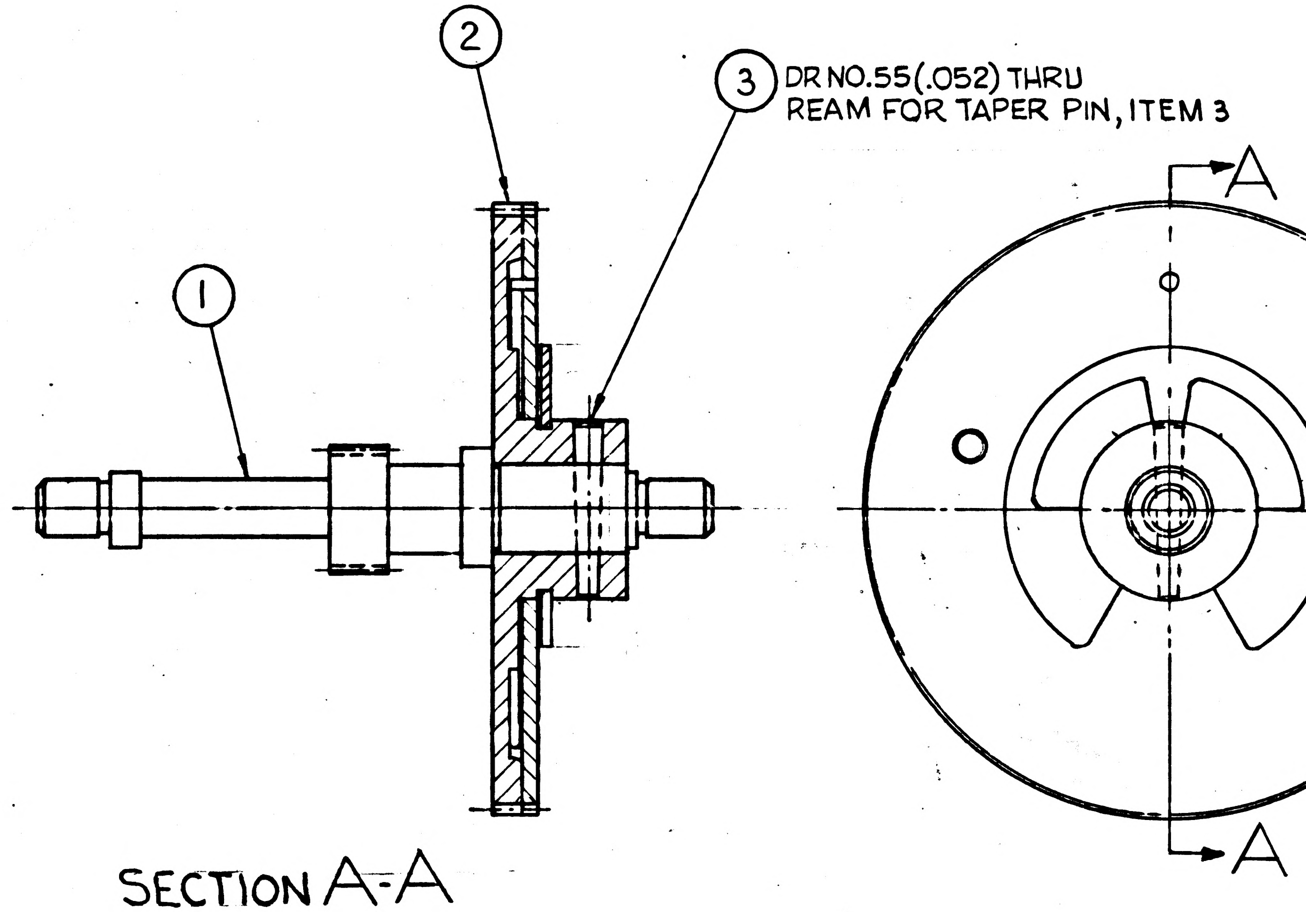
MASTER

1019704

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMB PER ND1002019.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03657 **DATE** 10/8/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		MS24692-27	73002305020		PIN, TAPER (7/0 x 3/8 LG)			
2	1		1017391	17020110050		GEAR ASSY, ANTI-BACKLASH			
1	1		1019062	16020110500		SHAFT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —//—	± —//—	± —//—

DO NOT SCALE THIS DRAWING

MATERIAL —//—

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110260

DRAWN G. Borsody DATE 9-25-63
CHECKED 10-3-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W J Rhine 10-8-63
10-7-63
MIT APPROVAL 8 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSY, GEAR
(PINION: 24T/96P, GEAR: 120T/96P)
(S 3)

CODE IDENT NO. | SIZE C | NASA NUMBER 1019704

SCALE 4/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

MASTER

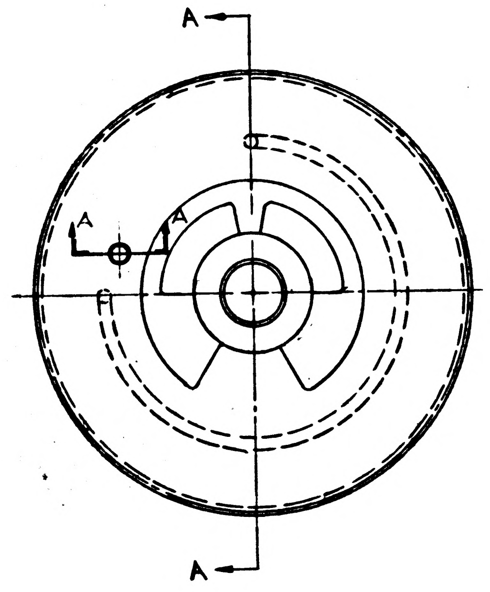
1019705

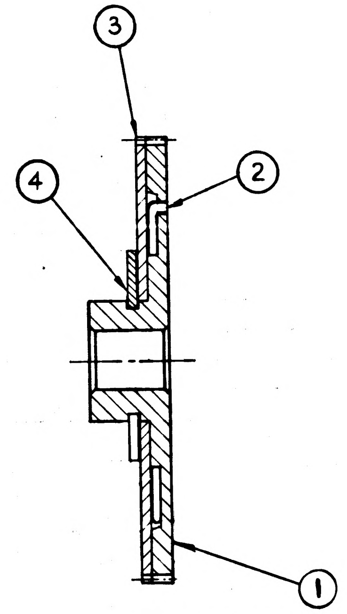
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

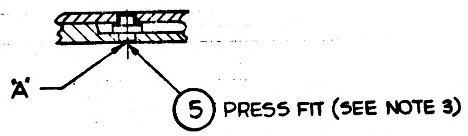
NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) GENERAL MACHINING STANDARDS PER ND10020078.
3.) ORDER OF OPERATION:
   a.) ASSEMBLE ITEMS 1, 2 & 3
   b.) FROM POINT OF EQUILIBRUM BETWEEN FRICTION VERSUS SPRING LOAD, SET ITEM 3 AT 75" TO 85" GRAM TORQUE, MESH WITH MATING PINION, CLAMP ITEMS 1 & 3 TOGETHER & SPOT THRU HOLE, CENTER LINE MARKED 'A', WITH NO.56 (.046) DR.
   c) DISASSEMBLE PARTS
   d.) REDRILL .046 HOLE IN ITEM 3, CENTER LINE MARKED 'A', WITH NO. 53 (.059) DR & REAM $.0505^{+.0005}_{-.0000}$ DIA THRU ITEM 1
   e.) PRESS ITEM 5 INTO ITEM 1
4.) IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURER'S SYMB PER ND1002019





SECTION A-A



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03657 DATE 10/8/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		1019026	16020110150		PIN, RESTRAINING, SPRING			
4	1		MS16633-4037	7445308 1013		RING, RETAINING, EXTERNAL			
3	1		1019061	16020110490		GEAR, SPUR (132T/96P)			
2	1		1019079-6	73006161006		SPRING, TORSION			
1	1		1019064	16020110520		GEAR, SPUR (132T/96P)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019714	
1019710	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110270

DRAWN C. BORSODY DATE 9-24-63
CHECKED 10-2-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W J 10-8-63
10/9/63
MIT APPROVAL 10/8/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

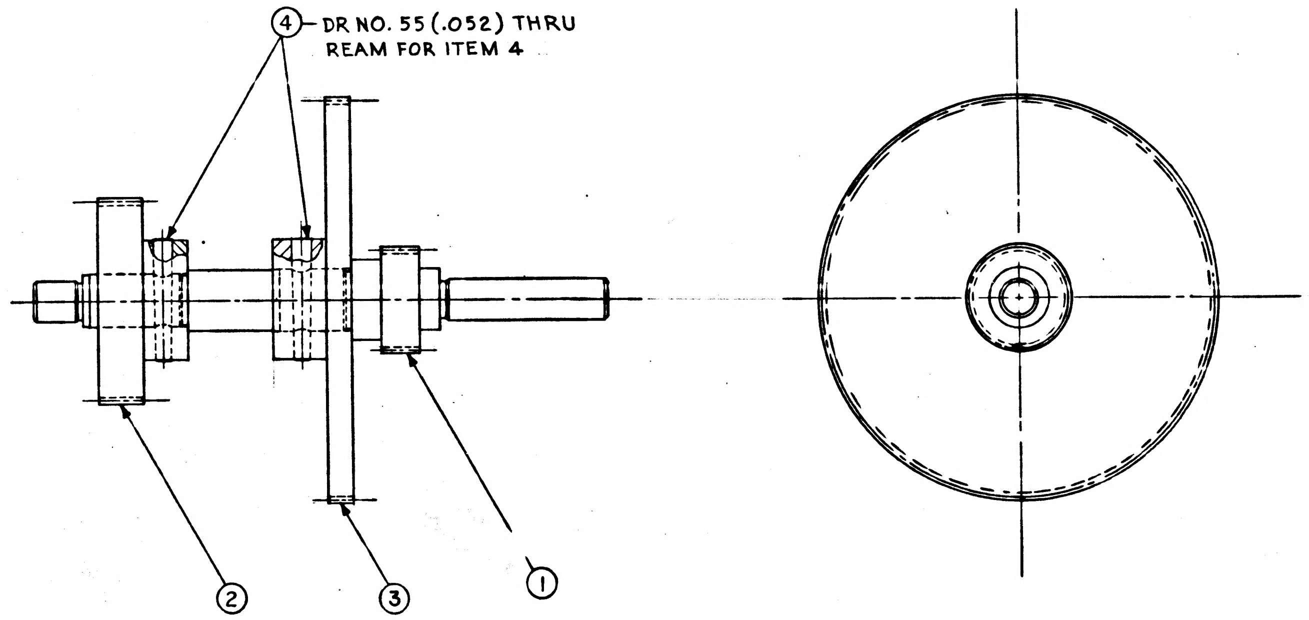
TITLE
GEAR ASSY,
ANTIBACKLASH (S4)(S5)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019705
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019706

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROV

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03651 **DATE** 10/8/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		MS 24692-27	73002305020		PIN, TAPER (7/0 × 3/8 LG)			
3	1		1019028	16020110170		GEAR, SPUR (120T/96P)			
2	1		1019025	16020110140		GEAR, SPUR (60T/96P)			
1	1		1019027	16020110160		SHAFT, GEAR, SPUR (60T/96P)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ± ; ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110280
DRAWN Al Rhodes DATE 9-25-63
CHECKED 10-3-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL 10-5-63
10/7/63
MIT APPROVAL 8 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

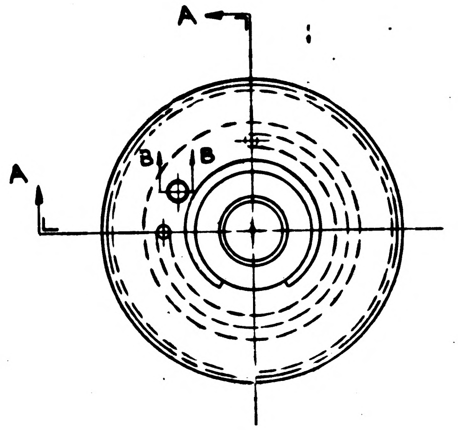
TITLE
CLUSTER ASSEMBLY,
GEAR (S8)

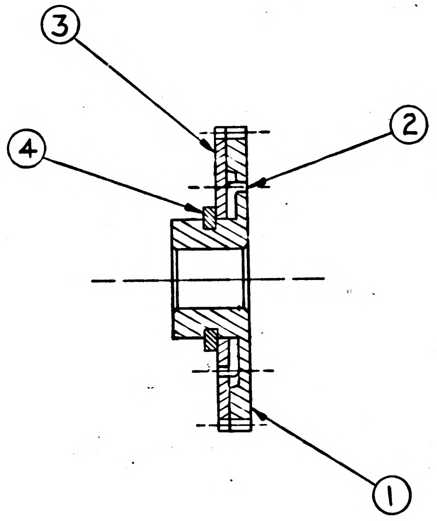
CODE IDENT NO.
SIZE D
NASA NUMBER 1019706
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019707

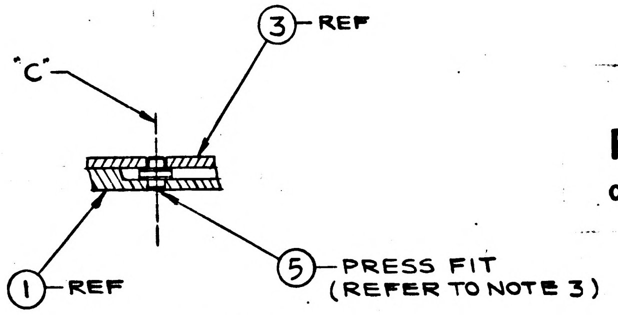
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. ORDER OF OPERATION.
   A. ASSEMBLY ITEMS ①,②,③
   B. FROM POINT OF EQUILIBRIUM BETWEEN FRICTION VERSUS SPRING LOAD, SET ITEM ③ AT 75" TO 85" GRAM TORQUE, MESH WITH MATING PINION, CLAMP ITEMS ① & ③ TOGETHER & SPOT DRILL THRU (.046) DIA HOLE IN ITEM ③ INTO ITEM ① WITH NO. 56 (.046) DRILL, (℄ "C")
   C. DISASSEMBLE PARTS.
   D. REDRILL (.046) DIA HOLE IN ITEM ③ (℄ "C") WITH NO. 53 (.059) DRILL.
   E. REAM (.046) DIA HOLE IN ITEM ① (℄ "C") TO $.0505^{+.0005}_{-.0000}$ DIA
   F. PRESS FIT ITEM ⑤ INTO ITEM ① (℄ "C") & REASSEMBLE PARTS
4. IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019





SECTION A-A



SECTION B-B

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03651 DATE 10/8/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		1019026	16020110150		PIN, RESTRAINING, SPRING			
4	1		MS16632-4037	74453082009		RING, RETAINING, EXTERNAL			
3	1		1019066	16020110540		GEAR, SPUR (88T/96P)			
2	1		1019079-3	73006161003		SPRING, TORSION			
1	1		1019067	16020110550		GEAR, SPUR (88T/96P)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019715	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 020110290
DRAWN RINDZUNER DATE 9-26-63
CHECKED 10-1-63
APPROVAL
APPROVAL 10-7-63
NASA APPROVAL W J Rhine 10-8-63
10-7-63
MIT APPROVAL 10-8-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

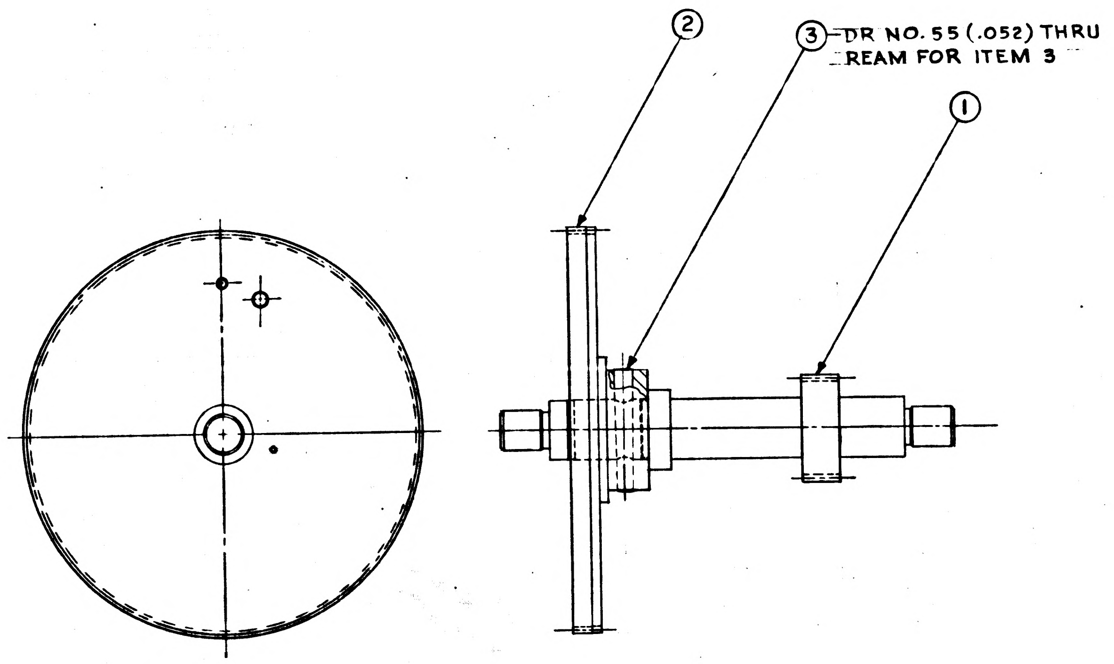
TITLE
GEAR ASSEMBLY
ANTI-BACKLASH
(88T/96P) (S2)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019707
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019708

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 036J7 DATE 10/8/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		MS24692-27	73002305020		PIN, TAPER (7/0 × 3/8 LG)			
2	1		1017391	17020110050		GEAR ASSEMBLY, ANTI-BACKLASH (120T/96P)			
1	1		1019057	16020110450		SHAFT, GEAR, SPUR (S7)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ± ; ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110300

DRAWN A.L. Rhodes DATE 9-25-63
CHECKED 10-2-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W J Rhine 10-5-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSEMBLY
GEAR (S7)

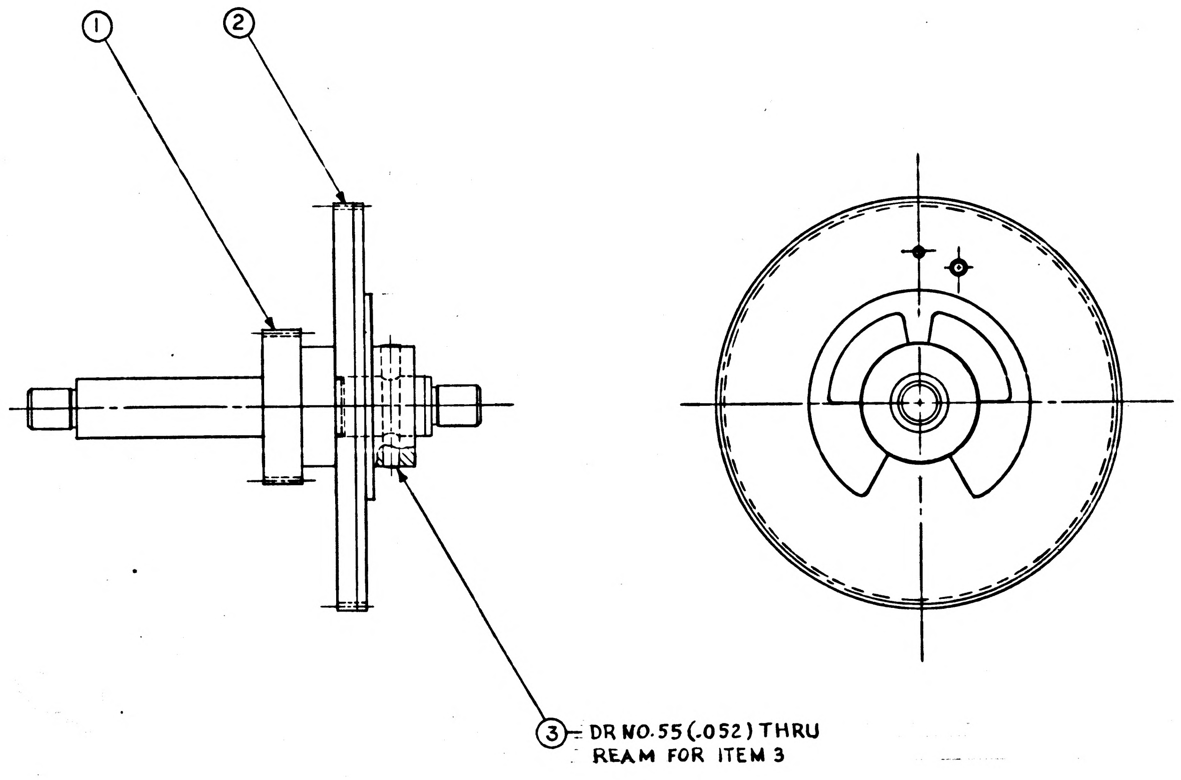
CODE IDENT NO.
SIZE D
NASA NUMBER 1019708
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019708

1019709

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03651 **DATE** 10/8/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		MS24692-27	73002305020		PIN, TAPER (7/0 × 3/8 LG)			
2	1		1017391	17020110050		GEAR ASSEMBLY, ANTI-BACKLASH (120T/96P)			
1	1		1019058	16020110460		SHAFT, GEAR, SPUR (S6)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110310
DRAWN A.L. Rhodes DATE 9-24-63
CHECKED 10-3-63
APPROVAL
APPROVAL 10 2 63
NASA APPROVAL 10-8-63
10/7/63
MIT APPROVAL 10/8/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSEMBLY,
GEAR (S6)

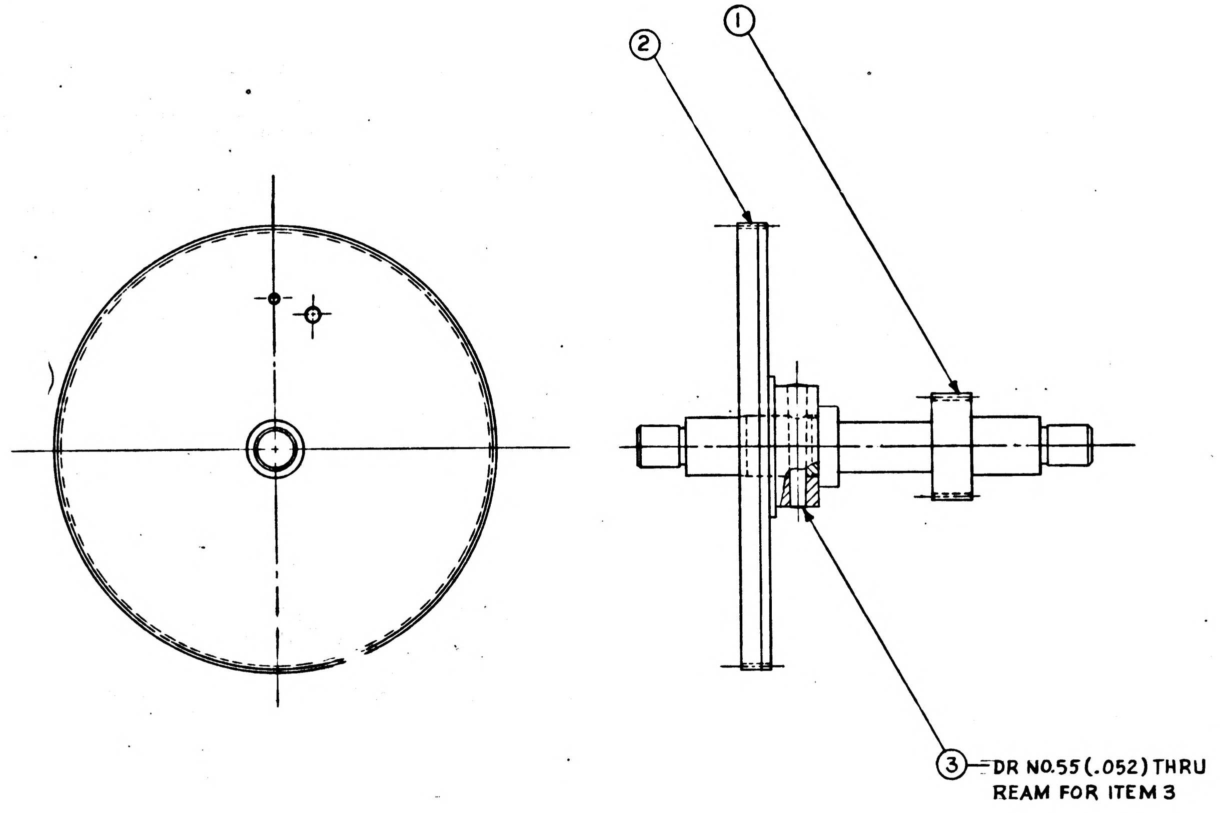
CODE IDENT NO.
SIZE D
NASA NUMBER 1019709
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019709

1019710

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING NASA DWG, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 036J7 **DATE** 10/1/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		MS24692-27	73002305020		PIN, TAPER (7/0 × 3/8 LG)			
2	1		1019705	17020110270		GEAR ASSY, ANTIBACKLASH (132T/96P)			
1	1		1019063	16020110510		SHAFT, GEAR, SPUR (30T/96P)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110320
DRAWN A. L. Rhodes DATE 9-26-63
CHECKED 10-3-63
APPROVAL
APPROVAL 10-2-63
NASA APPROVAL W G Rhine 10-8-63
10-7-63
MIT APPROVAL 8 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSEMBLY
GEAR (S4)

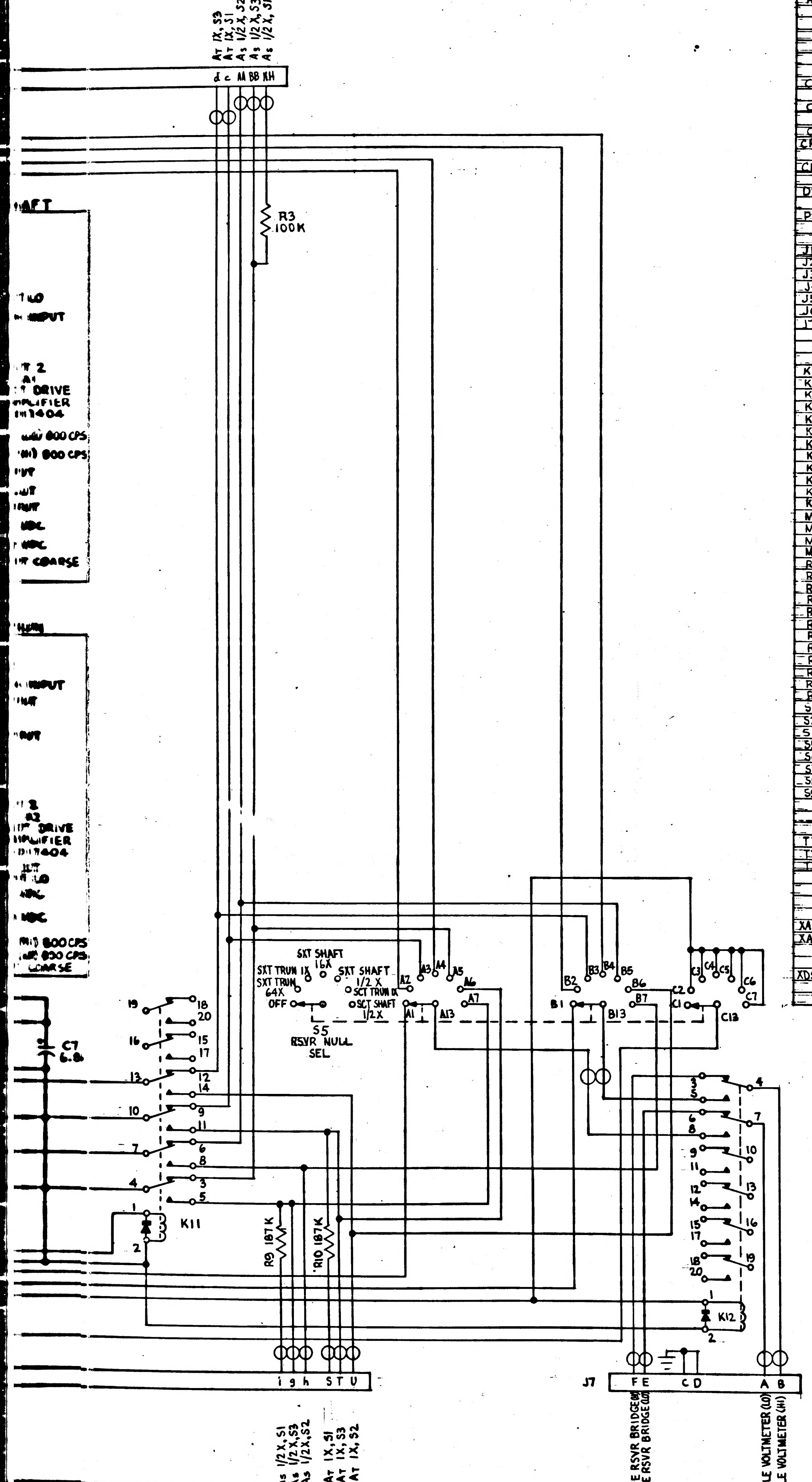
CODE IDENT NO.
SIZE D
NASA NUMBER 1019710
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

C 1019711

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 99177	11-6-63	
B		ADDED TO XA1 & XA2 - INPUT 2 AND ASSOCIATE WIRING	ECP 99168	
C		REVISED PER ECP 104984	3-1-64	4/1/64

TDR 09838 DATE 6/2/64

E-157



AT 1X, S3
AT 1X, S1
As 1/2X, S2
As 1/2X, S3
As 1/2X, S1
d c AA BB KH
R3
100K
INPUT
DRIVE
AMPLIFIER
800 CPS
800 CPS
COARSE
INPUT
DRIVE
AMPLIFIER
800 CPS
800 CPS
COARSE
C7
6.8
19 18 20 16 15 17 13 12 14 10 9 11 7 6 8 4 3 5
1 2
K11
SXT SHAFT 16X
SXT TRUN 1X
SXT SHAFT 1/2 X
SXT TRUN 64X
OFF
SCT TRUN 1X
SCT SHAFT 1/2X
S5
RSVR NULL SEL
A1 A2 A3 A4 A5 A6 A7 A13
B1 B2 B3 B4 B5 B6 B7 B13
C1 C2 C3 C4 C5 C6 C7 C13
R9 187K
R10 187K
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
1 2
K12
i g h S T U
J7
F E C D A B
SCT As 1/2X, S1
SCT As 1/2X, S3
SCT As 1/2X, S2
SCT AT 1X, S1
SCT AT 1X, S3
SCT AT 1X, S2
DECADE RSVR BRIDGE (HI)
DECADE RSVR BRIDGE (LO)
PH ANGLE VOLTMETER (LO)
PH ANGLE VOLTMETER (HI)

1019711 | C

REF DESIG	ZONE	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
A1			1017404	17020110170	AMPLIFIER. ASSY			
A2			1017404	17020110170	AMPLIFIER ASSY			
C3			1010264-33		CAPACITOR	.47UF		200V
C5			1010264-33		CAPACITOR	.47UF		200V
C7			1006755-79		CAPACITOR	6.8UF	10%	35V
CR1			1010372-18		DIODE, ZENER		5%	10V
CB1			1006915-18		CIRCUIT BREAKER			
DS1			1017463	68257001901	LAMP, NEON			
PS1			1017457	16020110620	POWER SUPPLY			
J1			MS3122E-22-55S		CONNECTOR			
J2			MS3122E-10-6S					
J3			MS3122E-14-19S					
J4			MS3102A-22-22P					
J5			MS3122E-14-5S					
J6			MS3122E-20-41S					
J7			MS3122E-10-6SW		CONNECTOR			
K1			1017466	16020110680	RELAY W/INT DIODE			
K2								
K3								
K4								
K5								
K6								
K7								
K8								
K9								
K10								
K11								
K12			1017466	16020110680	RELAY W/INT DIODE			
M1			1017460-5	68421001105	VOLTMETER, MULTIRANGE			
M2			1019716	17020110380	COUNTER			
M3			1019716	17020110380	COUNTER			
M4			1006927		INDICATOR, TIME ELAPSE			
R1			RN60D-1003F,	MIL-R-101509	RESISTOR	100K	±1%	1/8 W
R2			RN60D-1003F,	MIL-R-101509		100K	±1%	1/8 W
R3			RN60D-1003F,	MIL-R-101509	RESISTOR	100K	±1%	1/8 W
R4			1017460-2	68421001102		8K	±1%	1/2 W
R5			RW57-G-R50			.5	±5%	5W
R6			1016003-20	68410008002		1		25 W
R7			RW30-Y-2R0	68180154020		2		11 W
R8			1006760-50			5.6K	2%	1/2W
R9			RN60D-1873F,	MIL-R-101509		187K	±1%	1/8 W
R10			RN60D-1873F,	MIL-R-101509	RESISTOR	187K	±1%	1/8 W
R11			RN60D-1003F,	MIL-R-101509		100K	±1%	1/8 W
R12			RN60D-1003F,	MIL-R-101509		100K	±1%	1/8 W
S1			MS25307-23		SWITCH			
S2			1006895-1		, ROTARY			
S3			1006953-9		, ROTARY			
S5			1006953-14		, ROTARY			
S6			1006953-4		, ROTARY			
S7			1006953-5		, ROTARY			
S8			1006953-10		, ROTARY			
S9			1006953-13		SWITCH, ROTARY			
T1			1017484	68400150501	TRANSFORMER, VAR			
T2			1017462	68400183901	TRANSFORMER, STEP DN			
T3			MS90018-2		TRANSFORMER			
XA1			1015957-136	68502002202	CONNECTOR			
XA2			1015957-136	68502002202	CONNECTOR			
XDS1			1017465	68251002105	LAMP, INDICATOR			

REFERENCE DRAWING
L WIRING DIAGRAM 1019712

F3

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 036J-2 DATE 10/8/63

34

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110330
DRAWN I. MARGIOTTA DATE 9-10-63
CHECKED 9/20/63
APPROVAL 9/20/63
APPROVAL
NASA APPROVAL 10-8-63 W. J. Rhine 10-7-63
MIT APPROVAL

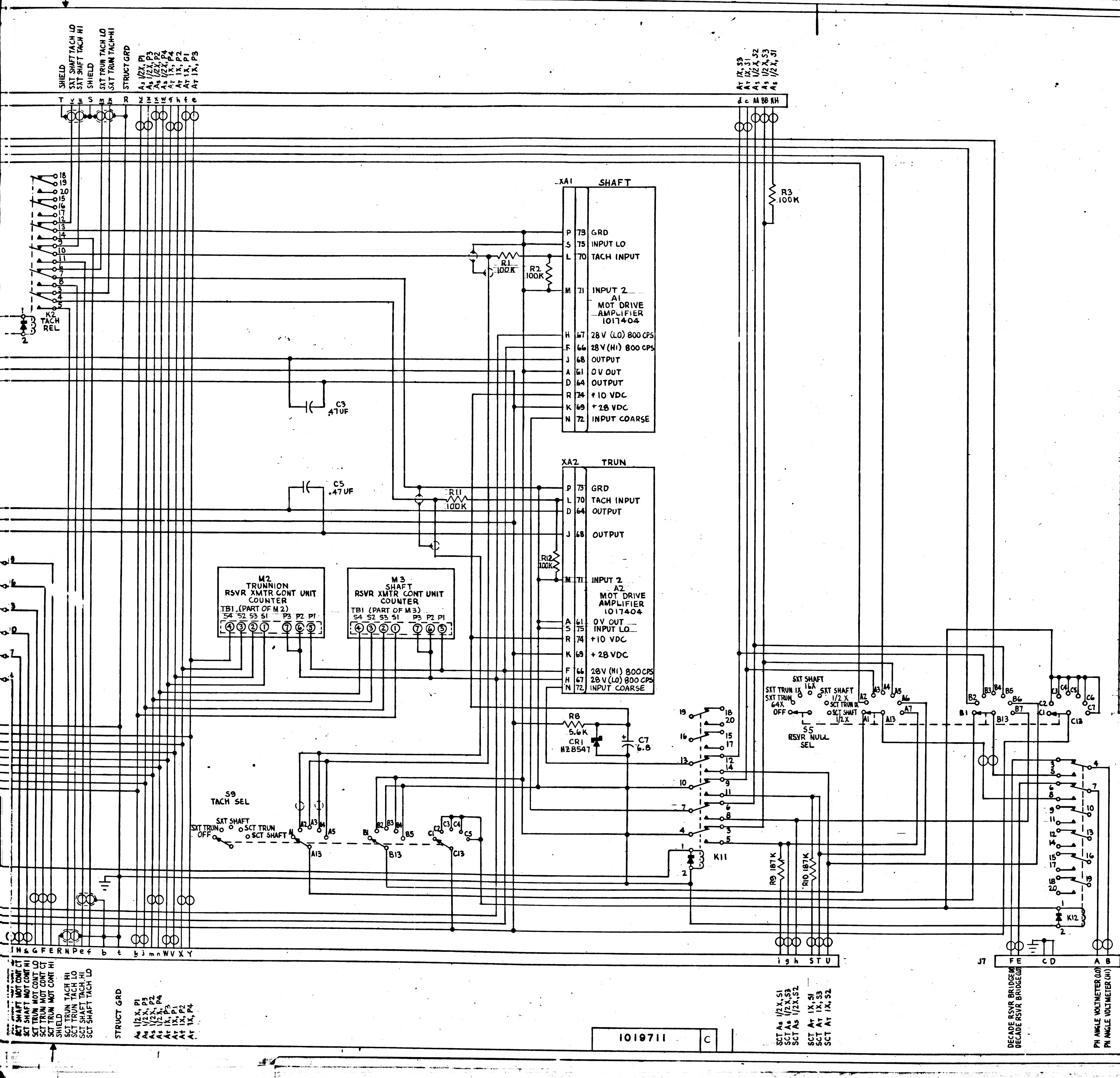
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE R
NASA NUMBER 1019711
SCALE NONE WEIGHT CALC ACTUAL SHEET 1 OF 1

E-159

MASTER


SHIELD
SXT SHAFT TACH LO
SXT SHAFT TACH HI
SHIELD
SXT TRUN TACH LO
SXT TRUN TACH HI
STRUCT GRD
XA1 SHAFT
GRD
INPUT LO
TACH INPUT
INPUT 2
A1 MOT DRIVE AMPLIFIER 1017404
28 V (LO) 800 CPS
28 V (HI) 800 CPS
OUTPUT
0V OUT
OUTPUT
+10 VDC
+28 VDC
INPUT COARSE
XA2 TRUN
GRD
TACH INPUT
OUTPUT
OUTPUT
INPUT 2
A2 MOT DRIVE AMPLIFIER 1017404
0V OUT
INPUT LO
+10 VDC
+28 VDC
28V (HI) 800 CPS
28 V (LO) 800 CPS
INPUT COARSE
R1 100K
R2 100K
R3 100K
R11 100K
R12 100K
C3 .47UF
C5 .47UF
K2 TACH REL
M2 TRUNNION RSVR XMTR CONT UNIT COUNTER
TB1 (PART OF M2)
M3 SHAFT RSVR XMTR CONT UNIT COUNTER
TB1 (PART OF M3)
S4 S2 S3 S1 P3 P2 P1
R8 5.6K
CR1 HZ8547
C7 6.8
S9 TACH SEL
SXT TRUN
SXT SHAFT
SCT TRUN
SCT SHAFT
OFF
K11
R9 187K
R10 187K
S5 RSVR NULL SEL
SXT SHAFT 16X
SXT TRUN 1X
SXT TRUN 64X
SXT SHAFT 1/2 X
SCT TRUN
SCT SHAFT 1/2X
K12
J7
SCT TRUN TACH HI
SCT TRUN TACH LO
SCT SHAFT TACH HI
SCT SHAFT TACH LO
SCT SHAFT MOT CONT LO
SCT SHAFT MOT CONT HI
SCT TRUN MOT CONT LO
SCT TRUN MOT CONT HI
SCT As 1/2X, S1
SCT As 1/2X, S3
SCT As 1/2X, S2
SCT At 1X, S1
SCT At 1X, S3
SCT At 1X, S2
DECADE RSVR BRIDGE (HI)
DECADE RSVR BRIDGE (LO)
PH ANGLE VOLTMETER (LO)
PH ANGLE VOLTMETER (HI)

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
A1			1017404	17020110170	AMPLIFIER. ASSY			
A2			1017404	17020110170	AMPLIFIER ASSY			
C3			1010264-33		CAPACITOR	.47UF		200V
C5			1010264-33		CAPACITOR	.47UF		200V
C7			1006755-79		CAPACITOR	6.8UF	10%	35V
CR1			1010372-18		DIODE, ZENER		5%	10V
CB1			1006915-18		CIRCUIT BREAKER			
DS1			1017463	68257001901	LAMP, NEON			
PS1			1017457	16020110620	POWER SUPPLY			
J1			MS3122E-22-55S		CONNECTOR			
J2			MS3122E-10-6S					
J3			MS3122E-14-19S					
J4			MS3102A-22-22P					
J5			MS3122E-14-5S					
J6			MS3122E-20-41S					
J7			MS3122E-10-6SW		CONNECTOR			
K1			1017466	16020110680	RELAY W/INT DIODE			
K2								
K3								
K4								
K5								
K6								
K7								
K8								
K9								
K10								
K11								
K12			1017466	16020110680	RELAY W/INT DIODE			
M1			1017460-5	68421001105	VOLTMETER, MULTIRANGE			
M2			1019716	17020110380	COUNTER			
M3			1019716	17020110380	COUNTER			
M4			1006927		INDICATOR, TIME ELAPSE			
R1			RN60D-1003F, MIL-R-101509		RESISTOR	100K	±1%	1/8 W
R2			RN60D-1003F, MIL-R-101509			100K	±1%	1/8 W
R3			RN60D-1003F, MIL-R-101509		RESISTOR	100K	±1%	1/8 W
R4			1017460-2	68421001102		8K	±1%	1/2 W
R5			RW57-G-R50			.5	±5%	5W
R6			1016003-20	68410008002		1		25 W
R7			RW30 Y 2R0	68180154020		2		11 W
R8			1006760-50			5.6K	2%	1/2W
R9			RN60D-1873F, MIL-R-101509			187K	±1%	1/8 W
R10			RN60D-1873F, MIL-R-101509		RESISTOR	187K	±1%	1/8 W
R11			RN60D-1003F, MIL-R-101509			100K	±1%	1/8 W
R12			RN60D-1003F, MIL-R-101509			100K	±1%	1/8 W
S1			MS25307-23		SWITCH			
S2			1006895-1		, ROTARY			
S3			1006953-9		, ROTARY			
S5			1006953-14		, ROTARY			
S6			1006953-4		, ROTARY			
S7			1006953-5		, ROTARY			
S8			1006953-10		, ROTARY			
S9			10069[illegible]-13		SWITCH , ROTARY			
T1			1017484	68[illegible]0150501	TRANSFORMER, VAR			
T2			1017462	68400183901	TRANSFORMER, STEP DN			
T3			MS90018-2		TRANSFORMER			
XA1			1015957-136	68502002202	CONNECTOR			
XA2			1015957-136	68502002202	CONNECTOR			
XDS1			1017465	68251002105	LAMP, INDICATOR			

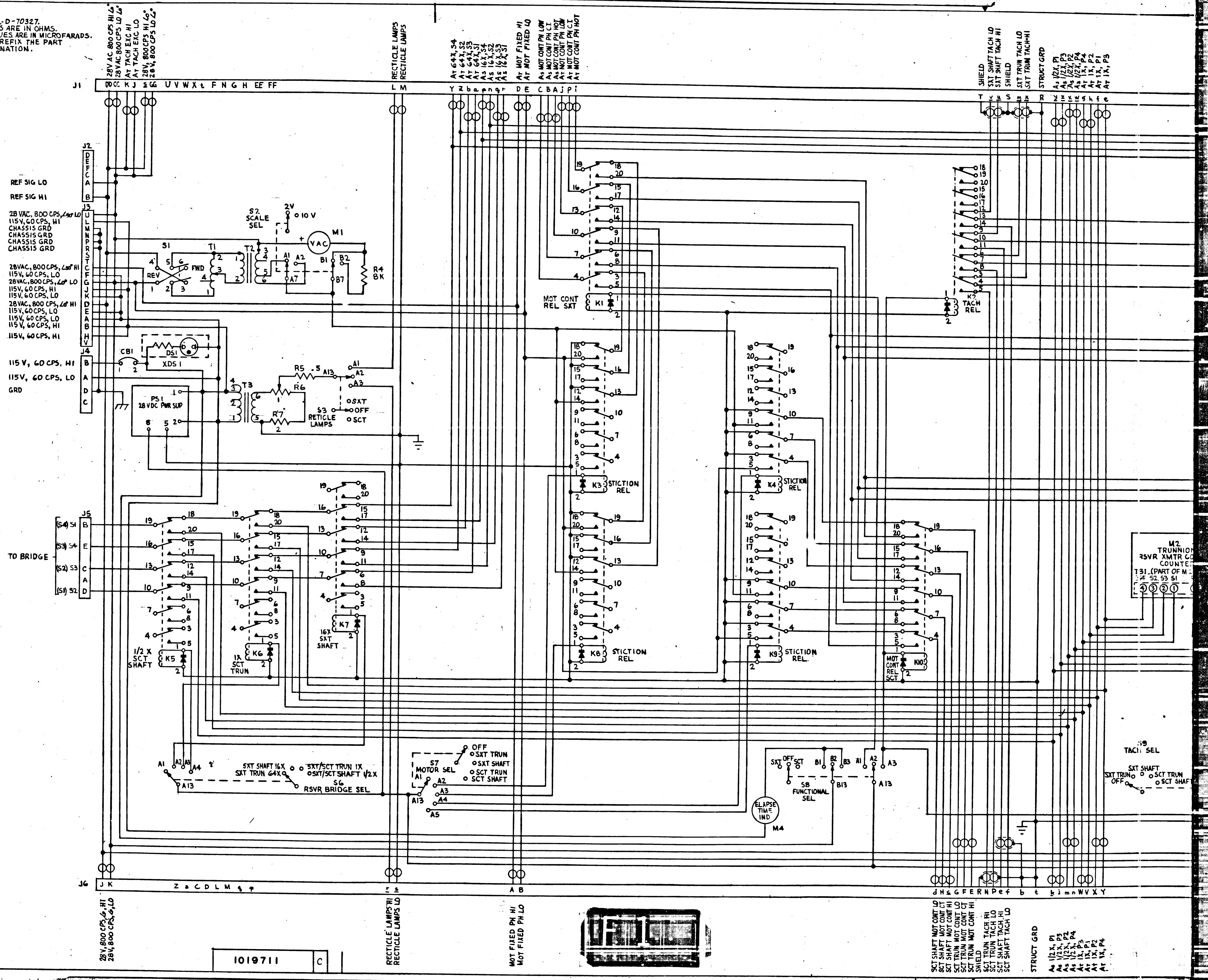
REFERENCE DRAWIN
1 WIRING DIAGRA

1019711 C

F 2

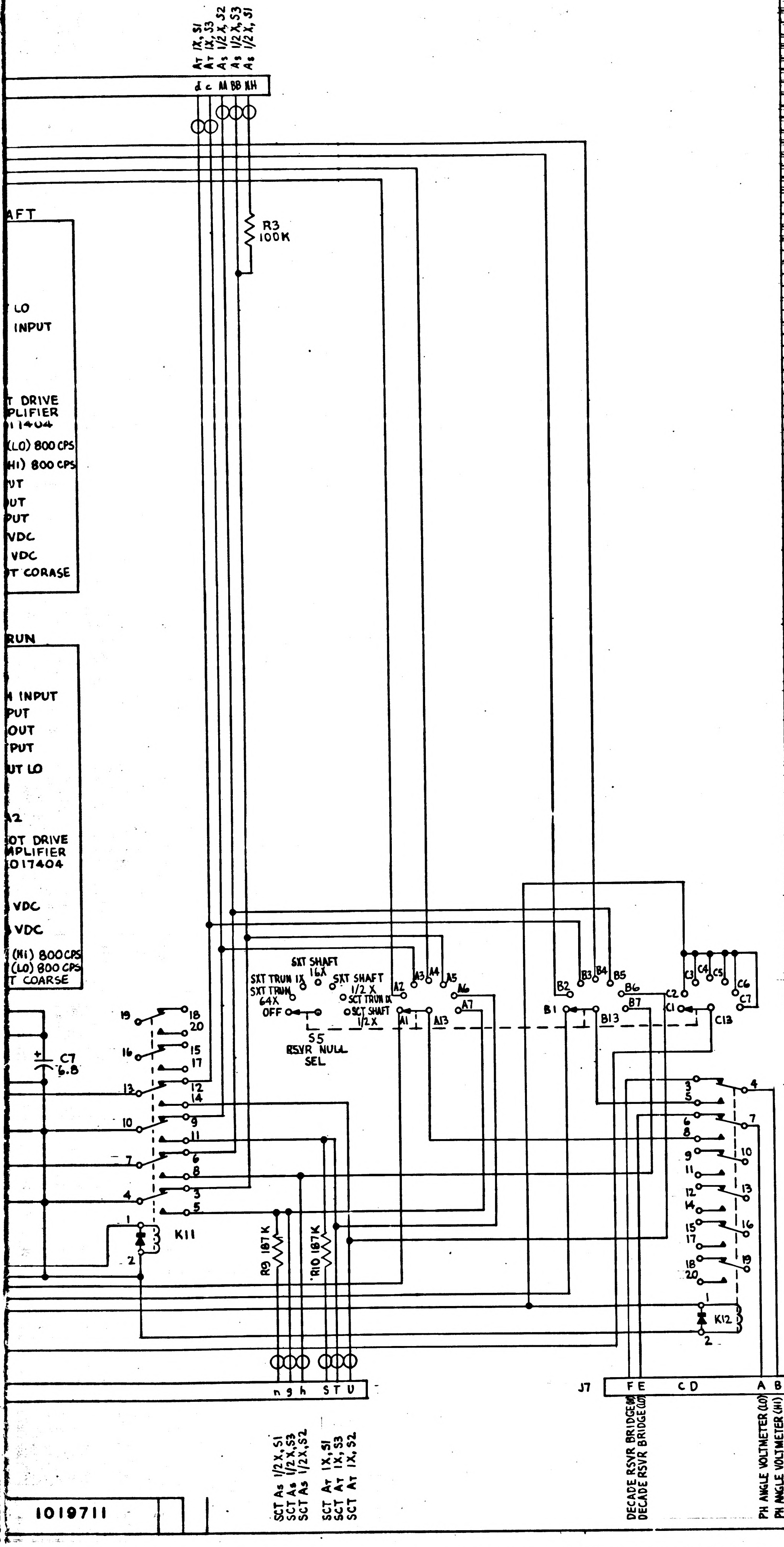
MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. REFERENCE DESIGNATION ARE ABBREVIATED, PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.


J1
DD CC K J s GG U V W X t F N G H EE FF
28V AC 800 CPS HI ∠0°
28V AC 800 CPS LO ∠0°
AT TACH EXC HI
AT TACH EXC LO
28V, 800 CPS HI ∠0°
28V, 800 CPS LO ∠0°
L M
RECTICLE LAMPS
RECTICLE LAMPS
Y Z b a p n q r D E C B A j P i
AT 64X, S4
AT 64X, S2
AT 64X, S3
AT 64X, S1
AS 16X, S4
AS 16X, S2
AS 16X, S3
AS 16X, S1
AT MOT FIXED HI
AT MOT FIXED LO
AS MOT CONT PH LOW
AS MOT CONT PH C.T.
AS MOT CONT PH HOT
AT MOT CONT PH LOW
AT MOT CONT PH C.T.
AT MOT CONT PH HOT
T v F S m k R y z x w g h f e
SHIELD
SXT SHAFT TACH LO
SXT SHAFT TACH HI
SHIELD
SXT TRUN TACH LO
SXT TRUN TACH-HI
STRUCT GRD
AS 1/2X, P1
AS 1/2X, P3
AS 1/2X, P2
AS 1/2X, P4
AT 1X, P4
AT 1X, P2
AT 1X, P1
AT 1X, P3
J2
D E F C A B
REF SIG LO
REF SIG HI
J3
U L M N P R S T C F G J K D E A B H V
28 VAC, 800 CPS, ∠50° LO
115V, 60 CPS, HI
CHASSIS GRD
CHASSIS GRD
CHASSIS GRD
CHASSIS GRD
28VAC, 800 CPS, ∠50° HI
115V, 60 CPS, LO
28VAC, 800 CPS, ∠0° LO
115V, 60 CPS, HI
115V, 60 CPS, LO
28VAC, 800 CPS, ∠0° HI
115V, 60 CPS, LO
115V, 60 CPS, LO
115V, 60 CPS, HI
115V, 60 CPS, HI
J4
B A D C
115 V, 60 CPS, HI
115V, 60 CPS, LO
GRD
CB1
DS1
XDS 1
PS1
28 VDC PWR SUP
S1
REV
FWD
T1
T2
S2
SCALE
SEL
2V
10 V
M1
VAC
A1 A2 A7
B1 B2 B7
R4
8K
T3
R5 .5
R6
R7 2
A13 A1 A2 A3
S3
RETICLE
LAMPS
SXT
OFF
SCT
K1
MOT CONT
REL SXT
K2
TACH
REL
K3
STICTION
REL
K4
STICTION
REL
K8
STICTION
REL
K9
STICTION
REL
K10
MOT
CONT
REL
SCT
J5
(S4) S1 B
(S3) S4 E
(S2) S3 C
A
(S1) S2 D
TO BRIDGE
K5
1/2 X
SCT
SHAFT
K6
1X
SCT
TRUN
K7
16X
SXT
SHAFT
A1 A2 A3 A4
A13
SXT SHAFT 16X
SXT TRUN 64X
SXT/SCT TRUN 1X
SXT/SCT SHAFT 1/2X
S6
RSVR BRIDGE SEL
S7
MOTOR SEL
OFF
SXT TRUN
SXT SHAFT
SCT TRUN
SCT SHAFT
A1 A13 A2 A3 A4 A5
SXT OFF SCT
B1 B2 B3 B13
A1 A2 A3 A13
S8
FUNCTIONAL
SEL
ELAPSE
TIME
IND
M4
M2
TRUNNION
RSVR XMTR CO
COUNTE
T31 (PART OF M
S4 S2 S3 S1
④ ③ ② ①
S9
TACH SEL
SXT SHAFT
SXT TRUN
OFF
SCT TRUN
SCT SHAFT
J6
J K Z a C D L M q p
28V, 800 CPS, ∠0°, HI
28V, 800 CPS, ∠0°, LO
r s
RECTICLE LAMPS HI
RECTICLE LAMPS LO
A B
MOT FIXED PH HI
MOT FIXED PH LO
d H s G F E R N P e f b t k j m n W V X Y
SCT SHAFT MOT CONT LO
SCT SHAFT MOT CONT CT
SCT SHAFT MOT CONT HI
SCT TRUN MOT CONT LO
SCT TRUN MOT CONT CT
SCT TRUN MOT CONT HI
SHIELD
SCT TRUN TACH HI
SCT TRUN TACH LO
SCT SHAFT TACH HI
SCT SHAFT TACH LO
STRUCT GRD
As 1/2X, P1
As 1/2X, P3
As 1/2X, P2
As 1/2X, P4
At 1X, P3
At 1X, P1
At 1X, P2
At 1X, P4
1019711
C

1019711

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


AT 1X, S1
AT 1X, S3
AS 1/2X, S2
AS 1/2X, S3
AS 1/2X, S1
d c AA BB HH
R3
100K
AFT
LO
INPUT
T DRIVE
PLIFIER
11404
(LO) 800 CPS
HI) 800 CPS
UT
UT
PUT
VDC
VDC
T CORASE
RUN
INPUT
PUT
OUT
PUT
UT LO
OT DRIVE
MPLIFIER
1017404
VDC
VDC
(HI) 800 CPS
(LO) 800 CPS
T COARSE
C7
6.8
SXT SHAFT
16X
SXT TRUN 1X
SXT TRUN
64X
OFF
SXT SHAFT
1/2 X
SCT TRUN
SCT SHAFT
1/2X
S5
RSVR NULL
SEL
A1 A2 A3 A4 A5 A6 A7 A13
B1 B2 B3 B4 B5 B6 B7 B13
C1 C2 C3 C4 C5 C6 C7 C13
K11
K12
R9 187K
R10 187K
n g h S T U
J7
F E C D A B
SCT AS 1/2X, S1
SCT AS 1/2X, S3
SCT AS 1/2X, S2
SCT AT 1X, S1
SCT AT 1X, S3
SCT AT 1X, S2
DECADE RSVR BRIDGE (HI)
DECADE RSVR BRIDGE (LO)
PH ANGLE VOLTMETER (LO)
PH ANGLE VOLTMETER (HI)

REF DESIG	ZONE	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
A1			1017404		AMPLIFIER. ASSY			
A2			1017404		AMPLIFIER ASSY			
C1			PENDING		CAPACITOR			
C2			PENDING					
C3			PENDING			1 UF		200V
C4			PENDING			.22UF		200V
C5			PENDING			1 UF		200V
C6			PENDING		CAPACITOR	.22UF		200V
C7			1006755 65		CAPACITOR	.47UF	10%	35V
CR1			1010372-18		DIODE, ZENER		5%	10V
DS1			PENDING		LAMP, NEON			
F1			PENDING		FUSE, CARTRIDGE			
F2			PENDING		FUSE, CARTRIDGE			
J1			MS3122E-22-55S		CONNECTOR			
J2			MS3122E-10-6S					
J3			MS3122E-14-18S					
J4			MS3102A-22-22P					
J5			MS3122E-14-5S					
J6			MS3122E-20-41S					
J7			MS3122E-10-6SW		CONNECTOR			
K1			PENDING		RELAY W/INT DIODE			
K2								
K3								
K4								
K5								
K6								
K7								
K8								
K9								
K10								
K11								
K12			PENDING		RELAY W/INT DIODE			
M1			PENDING		VOLTMETER, MULTIRANGE			
M2			1019716	17020110270	COUNTER			
M3			1019716	17020110270	COUNTER			
M4			1006927		INDICATOR, TIME ELAPSE			
R1			PENDING		RESISTOR			
R2			PENDING					
R3			RN60D 1003F			100K	±1%	1/8 W
R4			FURN WITH M1					
R5			PENDING			5	±5%	1W
R6			PENDING					
R7			PENDING					
R8			1006760-50			5.6K	2%	1/2W
R9			RN60D 1873F			187K	±1%	1/8 W
R10			RN60D 1873F		RESISTOR	187K	±1%	1/8 W
S1			MS25307-23		SWITCH			
S2			PENDING					
S3			PENDING					
S5			PENDING					
S6			PENDING					
S7			PENDING					
S8			PENDING					
S9			PENDING		SWITCH			
T1			PENDING		TRANSFORMER, STEP DN			
T2			PENDING		TRANSFORMER, VAR			
T3			PENDING		TRANSFORMER			
XA1			1015957-136		CONNECTOR			
XA2			1015957-136		CONNECTOR			
XDS1			PENDING		LAMP, INDICATOR			

REFERENCE DRAWING
1. WIRING DIAGRAM 1019712

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03652 DATE 10/8/63

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110330
DRAWN I MARGIOTTA DATE 9-10-63
CHECKED 9/23/63
APPROVAL 9/23/63
APPROVAL
NASA APPROVAL 10-8-63
11-7-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER SCHEMATIC DIAGRAM

CODE IDENT NO. | SIZE R | NASA NUMBER 1019711
SCALE NONE | WEIGHT | CALC ACTUAL | SHEET | OF 1

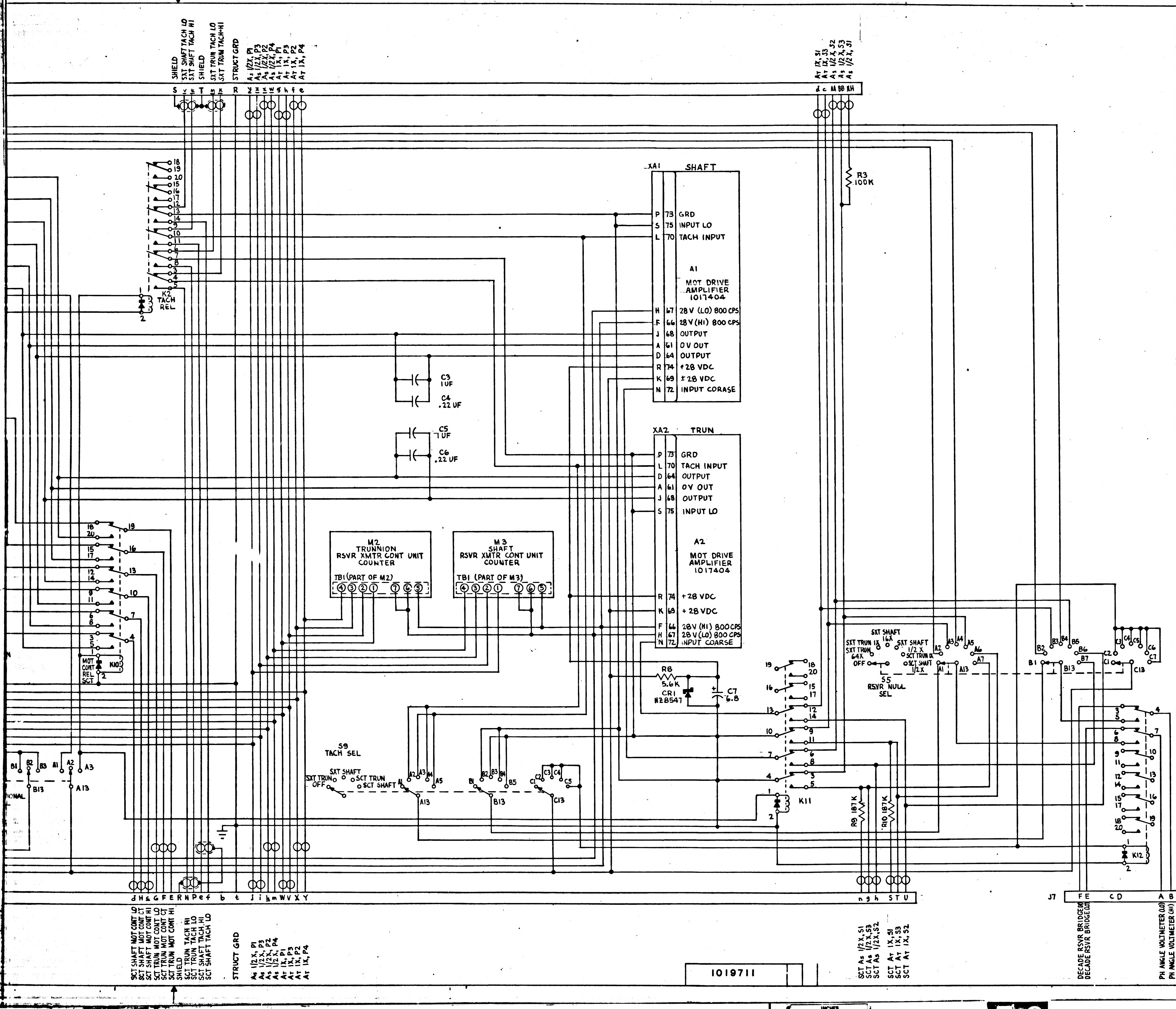
E-150

MASTER

1019711

INCHES
PHOTOGRAPHIC SCALE ONLY

F-3

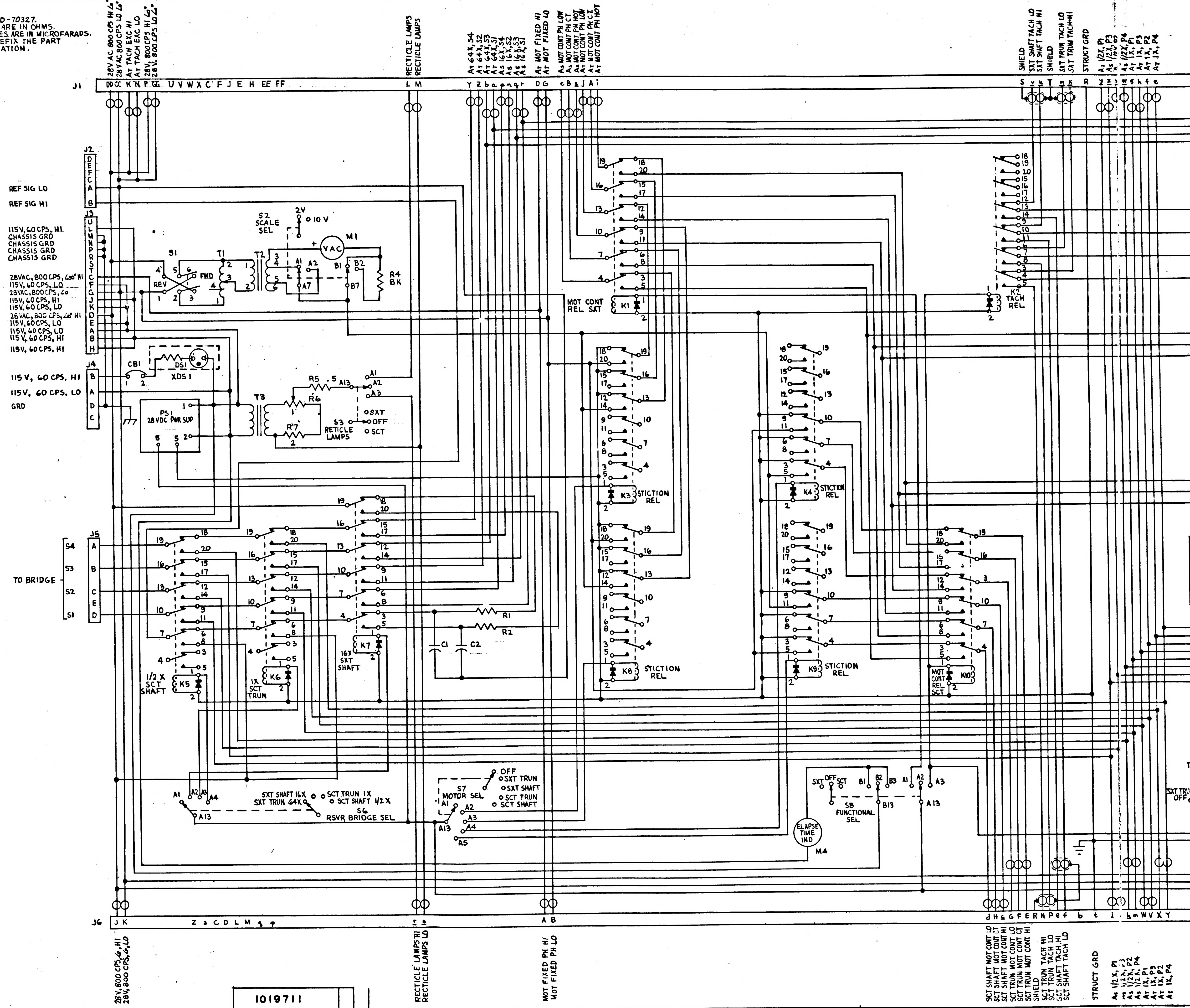

SHIELD
SXT SHAFT TACH LO
SXT SHAFT TACH HI
SHIELD
SXT TRUN TACH LO
SXT TRUN TACH HI
STRUCT GRD
As 1/2X, P1
As 1/2X, P3
As 1/2X, P2
As 1/2X, P4
AT 1X, P1
AT 1X, P3
AT 1X, P2
AT 1X, P4
AT 1X, S1
AT 1X, S3
As 1/2X, S2
As 1/2X, S3
As 1/2X, S1
R3 100K
XA1 SHAFT
GRD
INPUT LO
TACH INPUT
A1
MOT DRIVE AMPLIFIER 1017404
28 V (LO) 800 CPS
28 V (HI) 800 CPS
OUTPUT
0V OUT
OUTPUT
+28 VDC
±28 VDC
INPUT CORASE
C3 1UF
C4 .22 UF
C5 1UF
C6 .22 UF
XA2 TRUN
GRD
TACH INPUT
OUTPUT
0V OUT
OUTPUT
INPUT LO
A2
MOT DRIVE AMPLIFIER 1017404
+28 VDC
+28 VDC
28V (HI) 800 CPS
28 V (LO) 800 CPS
INPUT COARSE
K2 TACH REL
MOT CONT REL SCT
K10
M2 TRUNNION RSVR XMTR CONT UNIT COUNTER
TB1 (PART OF M2)
M3 SHAFT RSVR XMTR CONT UNIT COUNTER
TB1 (PART OF M3)
S9 TACH SEL
SXT TRUN OFF
SXT SHAFT
SXT TRUN
SCT SHAFT
R8 5.6K
CR1 1N3B547
C7 6.8
K11
S5 RSVR NULL SEL
SXT SHAFT 16X
SXT TRUN 1X
SXT TRUN 64X
OFF
SXT SHAFT 1/2 X
SCT TRUN 1X
SCT SHAFT 1/2X
R9 187 K
R10 187 K
K12
J7
PH ANGLE VOLTMETER (LO)
PH ANGLE VOLTMETER (HI)
DECADE RSVR BRIDGE (LO)
DECADE RSVR BRIDGE (HI)
SCT SHAFT MOT CONT LO
SCT SHAFT MOT CONT CT
SCT SHAFT MOT CONT HI
SCT TRUN MOT CONT LO
SCT TRUN MOT CONT CT
SCT TRUN MOT CONT HI
SHIELD
SCT TRUN TACH HI
SCT TRUN TACH LO
SCT SHAFT TACH HI
SCT SHAFT TACH LO
STRUCT GRD
SCT As 1/2X, S1
SCT As 1/2X, S3
SCT As 1/2X, S2
SCT AT 1X, S1
SCT AT 1X, S3
SCT AT 1X, S2

REF DESIG	ZONE	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
A1			1017404		AMPLIFIER. ASSY			
A2			1017404		AMPLIFIER ASSY			
C1			PENDING		CAPACITOR			
C2			PENDING					
C3			PENDING			UF		200V
C4			PENDING			.22UF		200V
C5			PENDING			UF		200V
C6			PENDING		CAPACITOR	.22UF		200V
C7			1006755-65		CAPACITOR	.7UF	10%	35V
CR1			1010372-18		DIODE, ZENER		5%	10V
DS1			PENDING		LAMP, NEON			
F1			PENDING		FUSE, CARTRIDGE			
F2			PENDING		FUSE, CARTRIDGE			
J1			MS3122E-22-55S		CONNECTOR			
J2			MS3122E-10-6S					
J3			MS3122E-14-18S					
J4			MS3102A-22-22P					
J5			MS3122E-14-5S					
J6			MS3122E-20-41S					
J7			MS3122E-10-6SW		CONNECTOR			
K1			PENDING		RELAY W/INT DIODE			
K2								
K3								
K4								
K5								
K6								
K7								
K8								
K9								
K10								
K11								
K12			PENDING		RELAY W/INT DIODE			
M1			PENDING		VOLTMETER, MULTIRANGE			
M2			1019716	17020110270	COUNTER			
M3			1019716	17020110270	COUNTER			
M4			1006927		INDICATOR, TIME ELAPSE			
R1			PENDING		RESISTOR			
R2			PENDING					
R3			RN60D-1003F			00K	±1%	1/8 W
R4			FURN WITH M1					
R5			PENDING			5	±5%	1W
R6			PENDING					
R7			PENDING					
R8			1006760-50			5.6K	2%	1/2W
R9			RN60D-1873F			187K	±1%	1/8 W
R10			RN60D-1873F		RESISTOR	187K	±1%	1/8 W
S1			MS25307-23		SWITCH			
S2			PENDING					
S3			PENDING					
S5			PENDING					
S6			PENDING					
S7			PENDING					
S8			PENDING					
S9			PENDING		SWITCH			
T1			PENDING		TRANS RMER, STEP DN			
T2			PENDING		TRANSFORMER, VAR			
T3			PENDING		TRANSFORMER			
XA1			1015957-136		CONNECTOR			
XA2			1015957-136		CONNECTOR			
XDS1			PENDING		LAMP, INDICATOR			

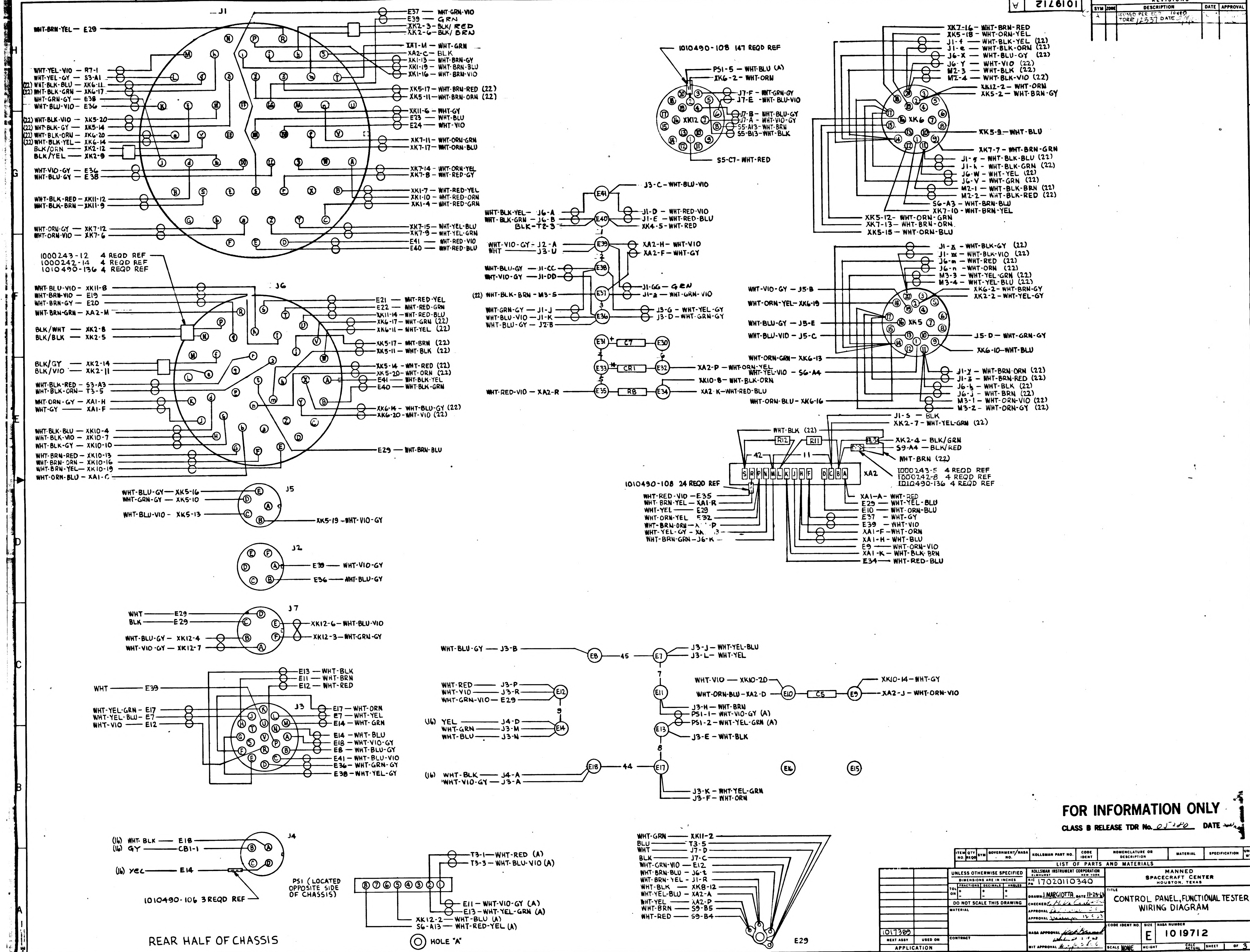
1019711

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUB ASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.


J1
28V AC 800 CPS HI
28V AC 800 CPS LO
AT TACH EXC HI
AT TACH EXC LO
28V, 800 CPS HI
28V, 800 CPS LO
RECTICLE LAMPS
RECTICLE LAMPS
MOT FIXED HI
MOT FIXED LO
SHIELD
SXT SHAFT TACH LO
SXT SHAFT TACH HI
SXT TRUN TACH LO
SXT TRUN TACH HI
STRUCT GRD
J2
REF SIG LO
REF SIG HI
J3
115V, 60 CPS, HI
CHASSIS GRD
CHASSIS GRD
CHASSIS GRD
CHASSIS GRD
28VAC, 800 CPS, HI
115V, 60 CPS, LO
28VAC, 800 CPS
115V, 60 CPS, HI
115V, 60 CPS, LO
28VAC, 800 CPS, HI
115V, 60 CPS, LO
115V, 60 CPS, LO
115V, 60 CPS, HI
115V, 60 CPS, HI
J4
115V, 60 CPS, HI
115V, 60 CPS, LO
GRD
S1
REV
FWD
T1
T2
S2
SCALE SEL
2V
10 V
M1
VAC
R4
8K
CB1
DS1
XDS1
PS1
28 VDC PWR SUP
T3
R5
R6
R7
S3
RETICLE LAMPS
SXT
OFF
SCT
MOT CONT REL SXT
K1
TACH REL
K2
STICTION REL
K3
K4
K8
K9
MOT CONT REL SCT
K10
J5
TO BRIDGE
S4
S3
S2
S1
1/2 X SCT SHAFT
K5
1X SCT TRUN
K6
16X SXT SHAFT
K7
R1
R2
C1
C2
S6
RSVR BRIDGE SEL
SXT SHAFT 16X
SXT TRUN 64X
SCT TRUN 1X
SCT SHAFT 1/2X
S7
MOTOR SEL
OFF
SXT TRUN
SXT SHAFT
SCT TRUN
SCT SHAFT
ELAPSE TIME IND
M4
S8
FUNCTIONAL SEL
J6
28V, 800 CPS, HI
28V, 800 CPS, LO
RECTICLE LAMPS HI
RECTICLE LAMPS LO
MOT FIXED PH HI
MOT FIXED PH LO
SCT SHAFT MOT CONT LO
SCT SHAFT MOT CONT HI
SCT TRUN MOT CONT LO
SCT TRUN MOT CONT HI
SHIELD
SCT TRUN TACH HI
SCT TRUN TACH LO
SCT SHAFT TACH HI
SCT SHAFT TACH LO
STRUCT GRD

1019711


J1
WHT-BRN-YEL — E29
E37 — WHT-GRN-VIO
E39 — GRN
XK2-3 — BLK/RED
XK2-6 — BLK/BRN
XA1-M — WHT-GRN
XA2-C — BLK
XK1-13 — WHT-BRN-GY
XK1-19 — WHT-BRN-BLU
XK1-16 — WHT-BRN-VIO
WHT-YEL-VIO — R7-1
WHT-YEL-GY — S3-A1
(22) WHT-BLK-BLU — XK6-11
(22) WHT-BLK-GRN — XK6-17
WHT-GRN-GY — E38
WHT-BLU-VIO — E36
XK5-17 — WHT-BRN-RED (22)
XK5-11 — WHT-BRN-ORN (22)
XK11-6 — WHT-GY
E23 — WHT-BLU
E24 — WHT-VIO
(22) WHT-BLK-VIO — XK5-20
(22) WHT-BLK-GY — XK5-14
(22) WHT-BLK-ORN — XK6-20
(22) WHT-BLK-YEL — XK6-14
BLK/ORN — XK2-12
BLK/YEL — XK2-9
XK7-11 — WHT-ORN-GRN
XK7-17 — WHT-ORN-BLU
WHT-VIO-GY — E36
WHT-BLU-GY — E38
XK7-14 — WHT-ORN-YEL
XK7-8 — WHT-RED-GY
XK1-7 — WHT-RED-YEL
XK1-10 — WHT-RED-ORN
XK1-4 — WHT-RED-GRN
WHT-BLK-RED — XK11-12
WHT-BLK-BRN — XK11-9
XK7-15 — WHT-YEL-BLU
XK7-9 — WHT-YEL-GRN
WHT-ORN-GY — XK7-12
WHT-ORN-VIO — XK7-6
E41 — WHT-RED-VIO
E40 — WHT-RED-BLU
1000243-12 4 REQD REF
1000242-14 4 REQD REF
1010490-136 4 REQD REF
J6
WHT-BLU-VIO — XK11-8
WHT-BRN-VIO — E19
WHT-BRN-GY — E20
WHT-BRN-GRN — XA2-M
BLK/WHT — XK2-8
BLK/BLK — XK2-5
E21 — WHT-RED-YEL
E22 — WHT-RED-GRN
XK11-14 — WHT-RED-BLU
XK6-17 — WHT-BRN (22)
XK6-11 — WHT-YEL (22)
XK5-17 — WHT-BRN (22)
XK5-11 — WHT-BLK (22)
BLK/GY — XK2-14
BLK/VIO — XK2-11
XK5-14 — WHT-RED (22)
XK5-20 — WHT-ORN (22)
E41 — WHT-BLK-YEL
E40 — WHT-BLK-GRN
WHT-BLK-RED — S3-A3
WHT-BLK-ORN — T3-5
WHT-ORN-GY — XA1-H
WHT-GY — XA1-F
XK6-14 — WHT-BLU-GY (22)
XK6-20 — WHT-VIO (22)
WHT-BLK-BLU — XK10-4
WHT-BLK-VIO — XK10-7
WHT-BLK-GY — XK10-10
E29 — WHT-BRN-BLU
WHT-BRN-RED — XK10-13
WHT-BRN-ORN — XK10-16
WHT-BRN-YEL — XK10-19
WHT-ORN-BLU — XA1-C
J5
WHT-BLU-GY — XK5-16
WHT-GRN-GY — XK5-10
WHT-BLU-VIO — XK5-13
XK5-19 — WHT-VIO-GY
J2
E39 — WHT-VIO-GY
E36 — WHT-BLU-GY
J7
WHT — E29
BLK — E29
WHT-BLU-GY — XK12-4
WHT-VIO-GY — XK12-7
XK12-6 — WHT-BLU-VIO
XK12-3 — WHT-GRN-GY
E13 — WHT-BLK
E11 — WHT-BRN
E12 — WHT-RED
WHT — E39
J3
WHT-YEL-GRN — E17
WHT-YEL-BLU — E7
WHT-VIO — E12
E17 — WHT-ORN
E7 — WHT-YEL
E14 — WHT-GRN
E14 — WHT-BLU
E18 — WHT-VIO-GY
E8 — WHT-BLU-GY
E41 — WHT-BLU-VIO
E36 — WHT-GRN-GY
E38 — WHT-YEL-GY
J4
(16) WHT-BLK — E18
(16) GY — CB1-1
(16) YEL — E14
1010490-106 3 REQD REF
PS1 (LOCATED OPPOSITE SIDE OF CHASSIS)
T3-1 — WHT-RED (A)
T3-3 — WHT-BLU-VIO (A)
E11 — WHT-VIO-GY (A)
E13 — WHT-YEL-GRN (A)
XK12-2 — WHT-BLU (A)
S6-A13 — WHT-RED-YEL (A)
REAR HALF OF CHASSIS
HOLE "A"
1010490-108 147 REQD REF
PS1-5 — WHT-BLU (A)
XK6-2 — WHT-ORN
J7-F — WHT-GRN-GY
J7-E — WHT-BLU-VIO
J7-B — WHT-BLU-GY
J7-A — WHT-VIO-GY
S5-A13 — WHT-BRN
S5-B13 — WHT-BLK
XK12
S5-C7 — WHT-RED
J3-C — WHT-BLU-VIO
WHT-BLK-YEL — J6-A
WHT-BLK-GRN — J6-B
BLK — T2-3
J1-D — WHT-RED-VIO
J1-E — WHT-RED-BLU
XK4-5 — WHT-RED
WHT-VIO-GY — J2-A
WHT — J3-U
XA2-H — WHT-VIO
XA2-F — WHT-GY
WHT-BLU-GY — J1-CC
WHT-VIO-GY — J1-DD
J1-GG — GRN
J1-a — WHT-GRN-VIO
(22) WHT-BLK-BRN — M3-5
WHT-GRN-GY — J1-J
WHT-BLU-VIO — J1-K
WHT-BLU-GY — J2-B
J3-G — WHT-YEL-GY
J3-D — WHT-GRN-GY
E41 E40 E39 E38 E37 E36
E31 C7 E30
E33 CR1 E32
E35 R8 E34
XA2-P — WHT-ORN-YEL
XK10-8 — WHT-BLK-ORN
XA2-K — WHT-RED-BLU
WHT-RED-VIO — XA2-R
XK7-16 — WHT-BRN-RED
XK5-18 — WHT-ORN-YEL
J1-f — WHT-BLK-YEL (22)
J1-e — WHT-BLK-ORN (22)
J6-X — WHT-BLU-GY (22)
J6-Y — WHT-VIO (22)
M2-3 — WHT-BLK (22)
M2-4 — WHT-BLK-VIO (22)
XK12-2 — WHT-ORN
XK5-2 — WHT-BRN-GY
XK6
XK5-9 — WHT-BLU
XK7-7 — WHT-BRN-GRN
J1-g — WHT-BLK-BLU (22)
J1-h — WHT-BLK-GRN (22)
J6-W — WHT-YEL (22)
J6-V — WHT-GRN (22)
M2-1 — WHT-BLK-BRN (22)
M2-2 — WHT-BLK-RED (22)
S6-A3 — WHT-BRN-BLU
XK7-10 — WHT-BRN-YEL
XK5-12 — WHT-ORN-GRN
XK7-13 — WHT-BRN-ORN
XK5-15 — WHT-ORN-BLU
J1-x — WHT-BLK-GY (22)
J1-w — WHT-BLK-VIO (22)
J6-m — WHT-RED (22)
J6-n — WHT-ORN (22)
M3-3 — WHT-YEL-GRN (22)
M3-4 — WHT-YEL-BLU (22)
XK6-2 — WHT-BRN-GY
XK2-2 — WHT-YEL-GY
WHT-VIO-GY — J5-B
WHT-ORN-YEL — XK6-19
WHT-BLU-GY — J5-E
WHT-BLU-VIO — J5-C
XK5
J5-D — WHT-GRN-GY
XK6-10 — WHT-BLU
WHT-ORN-GRN — XK6-13
WHT-YEL-VIO — S6-A4
WHT-ORN-BLU — XK6-16
J1-y — WHT-BRN-ORN (22)
J1-z — WHT-BRN-RED (22)
J6-b — WHT-BLK (22)
J6-j — WHT-BRN (22)
M3-1 — WHT-ORN-VIO (22)
M3-2 — WHT-ORN-GY (22)
J1-S — BLK
XK2-7 — WHT-YEL-GRN (22)
WHT-BLK (22)
R12 R11
42 11
XK2-4 — BLK/GRN
S9-A4 — BLK/RED
WHT-BRN (22)
1000243-5 4 REQD REF
1000242-8 4 REQD REF
1010490-136 4 REQD REF
XA2
S R P N M L K J H F D C B A
1010490-108 24 REQD REF
WHT-RED-VIO — E35
WHT-BRN-YEL — XA1-R
WHT-YEL — E29
WHT-ORN-YEL — E32
WHT-BRN-ORN — XA2-P
WHT-YEL-GY — XA2-3
WHT-BRN-GRN — J6-K
XA1-A — WHT-RED
E29 — WHT-YEL-BLU
E10 — WHT-ORN-BLU
E37 — WHT-GY
E39 — WHT-VIO
XA1-F — WHT-ORN
XA1-H — WHT-BLU
E9 — WHT-ORN-VIO
XA1-K — WHT-BLK-BRN
E34 — WHT-RED-BLU
WHT-BLU-GY — J3-B
E8 45 E7
J3-J — WHT-YEL-BLU
J3-L — WHT-YEL
WHT-RED — J3-P
WHT-VIO — J3-R
WHT-GRN-VIO — E29
E12
9
(16) YEL — J4-D
WHT-GRN — J3-M
WHT-BLU — J3-N
E14
7
E11
WHT-VIO — XK10-20
WHT-ORN-BLU — XA2-D
E10 C5 E9
XK10-14 — WHT-GY
XA2-J — WHT-ORN-VIO
J3-H — WHT-BRN
PS1-1 — WHT-VIO-GY (A)
PS1-2 — WHT-YEL-GRN (A)
E13
J3-E — WHT-BLK
8
(16) WHT-BLK — J4-A
WHT-VIO-GY — J3-A
E18 44 E17
E16 E15
J3-K — WHT-YEL-GRN
J3-F — WHT-ORN
WHT-GRN — XK11-2
BLU — T3-5
WHT — J7-D
BLK — J7-C
WHT-GRN-VIO — E12
WHT-BRN-BLU — J6-Z
WHT-BRN-YEL — J1-R
WHT-BLK — XK8-12
WHT-YEL-BLU — XA2-A
WHT-YEL — XA2-P
WHT-BRN — S9-B5
WHT-RED — S9-B4
E29
10 9 8 7 6 5 4 3 2 1
H G F E D C B A

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 10495 TDRE 12337 DATE		

A | 1019712

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05-280 DATE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340
DRAWN J. MARGIOTTA DATE 11-29-63
CHECKED
APPROVAL
APPROVAL 12-9-63
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

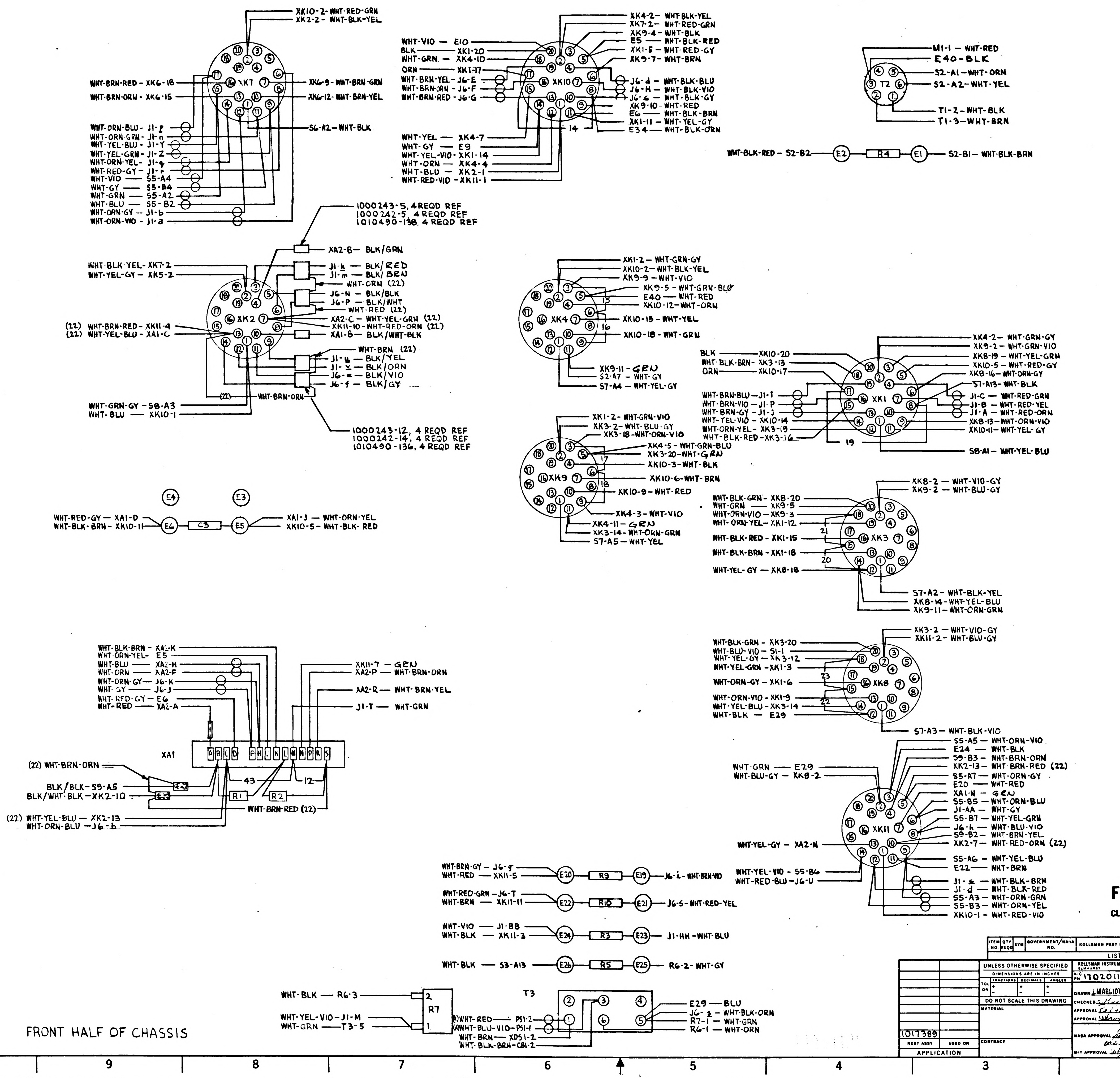
TITLE
CONTROL PANEL, FUNCTIONAL TESTER,
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019712
SCALE NONE
WEIGHT CALC ACTUAL
SHEET OF 3

1019712

1019712 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER EC 04951 TDRR/2337 DATE		


XK10-2- WHT-RED-GRN
XK2-2- WHT-BLK-YEL
WHT-BRN-RED - XK6-18
WHT-BRN-ORN - XK6-15
XK7
XK6-9 - WHT-BRN-GRN
XK6-12 - WHT-BRN-YEL
S6-A2 — WHT-BLK
WHT-ORN-BLU - J1-p
WHT-ORN-GRN - J1-n
WHT-YEL-BLU - J1-Y
WHT-YEL-GRN - J1-Z
WHT-ORN-YEL - J1-q
WHT-RED-GY - J1-r
WHT-VIO — S5-A4
WHT-GY — S5-B4
WHT-GRN — S5-A2
WHT-BLU — S5-B2
WHT-ORN-GY — J1-b
WHT-ORN-VIO - J1-a
WHT-VIO — E10
BLK — XK1-20
WHT-GRN — XK4-10
ORN — XK1-17
WHT-BRN-YEL - J6-E
WHT-BRN-ORN - J6-F
WHT-BRN-RED - J6-G
XK10
XK4-2- WHT-BLK-YEL
XK7-2- WHT-RED-GRN
XK9-4- WHT-BLK
E5 — WHT-BLK-RED
XK1-5 - WHT-RED-GY
XK9-7- WHT-BRN
J6-d - WHT-BLK-BLU
J6-H - WHT-BLK-VIO
J6-c - WHT-BLK-GY
XK9-10- WHT-RED
E6 — WHT-BLK-BRN
XK1-11 - WHT-YEL-GY
E34 — WHT-BLK-ORN
14
WHT-YEL — XK4-7
WHT-GY — E9
WHT-YEL-VIO - XK1-14
WHT-ORN — XK4-4
WHT-BLU — XK2-1
WHT-RED-VIO - XK11-1
M1-1 - WHT-RED
E40 - BLK
T2
S2-A1 - WHT-ORN
S2-A2 - WHT-YEL
T1-2 - WHT-BLK
T1-3 - WHT-BRN
WHT-BLK-RED - S2-B2
E2
R4
E1
S2-B1 - WHT-BLK-BRN
1000243-5, 4 REQD REF
1000242-5, 4 REQD REF
1010490-138, 4 REQD REF
XA2-B — BLK/GRN
WHT-BLK-YEL - XK7-2
WHT-YEL-GY - XK5-2
J1-k — BLK/RED
J1-m — BLK/BRN
WHT-ORN (22)
J6-N — BLK/BLK
J6-P — BLK/WHT
WHT-RED (22)
XK2
XA2-C — WHT-YEL-GRN (22)
(22) WHT-BRN-RED - XK11-4
(22) WHT-YEL-BLU - XA1-C
XK11-10-WHT-RED-ORN (22)
XA1-B — BLK/WHT-BLK
WHT-BRN (22)
J1-u — BLK/YEL
J1-v — BLK/ORN
J6-e — BLK/VIO
J6-f — BLK/GY
(22)
WHT-BRN-ORN
WHT-GRN-GY - S8-A3
WHT-BLU — XK10-1
1000243-12, 4 REQD REF
1000242-14, 4 REQD REF
1010490-136, 4 REQD REF
XK1-2 — WHT-GRN-GY
XK10-2 — WHT-BLK-YEL
XK9-9 — WHT-VIO
XK9-5 - WHT-GRN-BLU
E40 — WHT-RED
XK10-12 — WHT-ORN
15
XK4
XK10-15 - WHT-YEL
16
XK10-18 - WHT-GRN
XK9-11 - GRN
S2-A7 — WHT-GY
S7-A4 — WHT-YEL-GY
XK1-2- WHT-GRN-VIO
XK3-2- WHT-BLU-GY
XK3-18-WHT-ORN-VIO
XK4-5 - WHT-GRN-BLU
XK3-20-WHT-GRN
17
XK10-3-WHT-BLK
XK9
XK10-6-WHT-BRN
18
XK10-9 — WHT-RED
XK4-3 - WHT-VIO
XK4-11 - GRN
XK3-14- WHT-ORN-GRN
S7-A5 — WHT-YEL
E4
E3
WHT-RED-GY — XA1-D
WHT-BLK-BRN — XK10-11
E6
C3
E5
XA1-J — WHT-ORN-YEL
XK10-5 — WHT-BLK-RED
BLK — XK10-20
WHT-BLK-BRN - XK3-13
ORN — XK10-17
XK4-2 — WHT-GRN-GY
XK9-2 — WHT-GRN-VIO
XK8-19 — WHT-YEL-GRN
XK10-5 — WHT-RED-GY
XK8-16 — WHT-ORN-GY
S7-A13 — WHT-BLK
WHT-BRN-BLU — J1-f
WHT-BRN-VIO — J1-P
WHT-BRN-GY - J1-j
WHT-YEL-VIO - XK10-14
WHT-ORN-YEL - XK3-19
WHT-BLK-RED - XK3-16
XK1
J1-C — WHT-RED-GRN
J1-B — WHT-RED-YEL
J1-A — WHT-RED-ORN
XK8-13 — WHT-ORN-VIO
XK10-11 — WHT-YEL-GY
19
S8-A1 — WHT-YEL-BLU
XK8-2 — WHT-VIO-GY
XK9-2 — WHT-BLU-GY
WHT-BLK-GRN - XK8-20
WHT-GRN — XK9-5
WHT-ORN-VIO — XK9-3
WHT-ORN-YEL - XK1-12
21
WHT-BLK-RED - XK1-15
XK3
WHT-BLK-BRN - XK1-18
20
WHT-YEL-GY — XK8-18
S7-A2 - WHT-BLK-YEL
XK8-14 - WHT-YEL-BLU
XK9-11 - WHT-ORN-GRN
XK3-2 — WHT-VIO-GY
XK11-2 - WHT-BLU-GY
WHT-BLK-GRN - XK3-20
WHT-BLU-VIO — S1-1
WHT-YEL-GY — XK3-12
WHT-YEL-GRN - XK1-3
23
WHT-ORN-GY - XK1-6
XK8
WHT-ORN-VIO - XK1-9
22
WHT-YEL-BLU - XK3-14
WHT-BLK — E29
S7-A3 — WHT-BLK-VIO
WHT-BLK-BRN - XA2-K
WHT-ORN-YEL - E5
WHT-BLU — XA2-H
WHT-ORN — XA2-F
WHT-ORN-GY — J6-K
WHT-GY — J6-J
WHT-RED-GY — E6
WHT-RED — XA2-A
XK11-7 — GRN
XA2-P — WHT-BRN-ORN
XA2-R — WHT-BRN-YEL
J1-T — WHT-GRN
XA1
A B C D F H J K L M N P R S
(22) WHT-BRN-ORN
BLK/BLK - S9-A5
BLK/WHT-BLK - XK2-10
43
12
R1
R2
WHT-BRN-RED (22)
(22) WHT-YEL-BLU — XK2-13
WHT-ORN-BLU — J6-b
S5-A5 — WHT-ORN-VIO
E24 — WHT-BLK
S9-B3 — WHT-BRN-ORN
WHT-GRN — E29
WHT-BLU-GY — XK8-2
XK2-13 — WHT-BRN-RED (22)
S5-A7 — WHT-ORN-GY
E20 — WHT-RED
XA1-N — GRN
S5-B5 — WHT-ORN-BLU
J1-AA — WHT-GY
S5-B7 — WHT-YEL-GRN
J6-h — WHT-BLU-VIO
S9-B2 — WHT-BRN-YEL
XK11
WHT-YEL-GY — XA2-N
XK2-7 — WHT-RED-ORN (22)
S5-A6 — WHT-YEL-BLU
E22 — WHT-BRN
WHT-YEL-VIO - S5-B6
WHT-RED-BLU - J6-U
J1-c — WHT-BLK-BRN
J1-d — WHT-BLK-RED
S5-A3 — WHT-ORN-GRN
S5-B3 — WHT-ORN-YEL
XK10-1 — WHT-RED-VIO
WHT-BRN-GY — J6-g
WHT-RED — XK11-5
E20
R9
E19
J6-i - WHT-BRN-VIO
WHT-RED-GRN — J6-T
WHT-BRN — XK11-11
E22
R10
E21
J6-S - WHT-RED-YEL
WHT-VIO — J1-BB
WHT-BLK — XK11-3
E24
R3
E23
J1-HH - WHT-BLU
WHT-BLK — S3-A13
E26
R5
E25
R6-2 - WHT-GY
WHT-BLK — R6-3
R7
WHT-YEL-VIO - J1-M
WHT-GRN — T3-5
T3
(A) WHT-RED — PS1-2
(A) WHT-BLU-VIO — PS1-1
WHT-BRN — XDS1-2
WHT-BLK-BRN - CB1-2
E29 — BLU
J6-s — WHT-BLK-ORN
R7-1 — WHT-GRN
R6-1 — WHT-ORN
FRONT HALF OF CHASSIS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05450 DATE 20 Dec 63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340

DRAWN L MARGIOTTA DATE 11-23-63
CHECKED 12-5-63
APPROVAL 12-5-63
APPROVAL 12-9-63
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019712
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 3

1019712

A	1019712

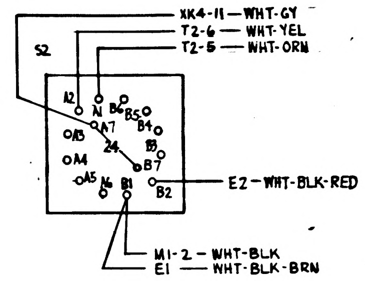
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
3. ▭ SYMBOL INDICATES INNER AND OUTER FERRULES AND SLEEVING
4. WIRE PER ND 1002032
5. ALL WIRE TO BE AWG NO. 20 UNLESS OTHERWISE INDICATED.
6. SOLDER PER ND 1002071

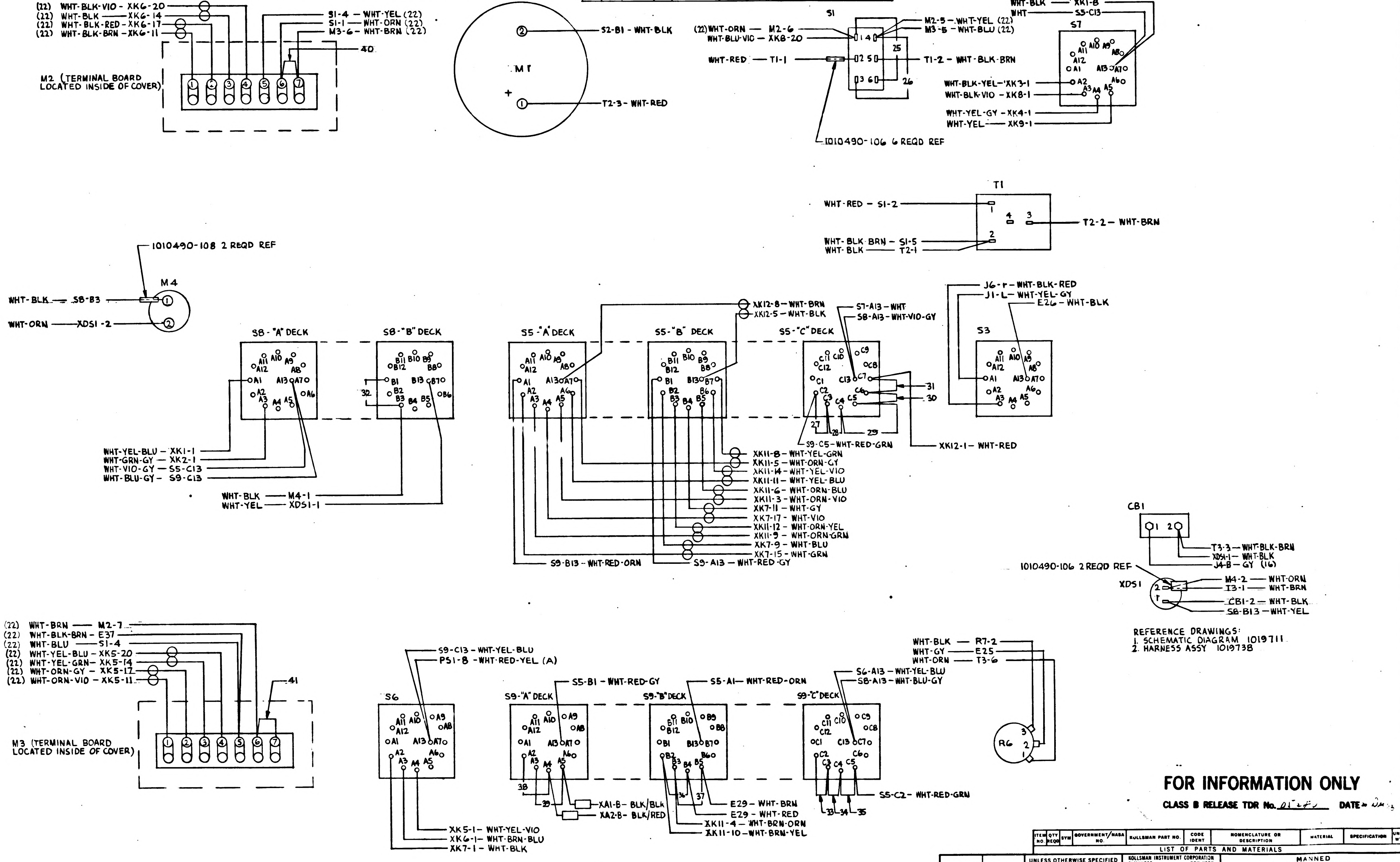
COND NO	PART NO. REF	AWG SIZE	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	MIL-W-3861 TYPE S	20	BARE WIRE		E39	E40	
2	↑	↑	↑		E38	E39	
3					E36	E37	
4					E31	E33	
5					E33	E35	
6					E30	E32	
7					E7	E11	
8					E13	E17	
9					E14	E12	
10							
11					XA2-M	XA2-C	1006776-20
12					XA1-M	XA1-S	1006776-20
13							
14					XK10-8	XK10-17	1006776-20
15					XK4-3	XK4-6	↑
16					XK4-6	XK4-9	
17					XK9-3	XK9-6	
18					XK9-6	XK9-9	
19					XK1-8	XK1-17	
20					XK3-12	XK3-15	
21	↓	↓	↓		XK3-15	XK3-18	↓
22	MIL-W-3861 TYPE S	20	BARE WIRE		XK8-12	XK8-15	1006776-20

COND NO.	PART NO. REF	AWG SIZE	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
23	MIL-W-3861 TYPE S	20	BARE WIRE		XK8-15	XK8-18	1006776-20
24	↑	↑	↑		S2-B7	S2-A7	
25					S1-1	S1-6	1006776-20
26					S1-4	S1-3	1006776-20
27					S5-C2	S5-C3	
28					S5-C3	S5-C4	
29					S5-C4	S5-C5	
30					S5-C5	S5-C6	
31					S5-C6	S5-C7	
32					S8-B1	S8-B3	1006776-20
33					S9-C2	S9-C3	
34					S9-C3	S9-C4	
35					S9-C4	S9-C5	
36					S9-B2	S9-B4	10106776-20
37					S9-B3	S9-B5	↑
38	↓	↓	↓		S9-A2	S9-A4	↓
39	MIL-W-3861 TYPE S	20	BARE WIRE		S9-A3	S9-A5	1006776-20
40	MIL-W-16878/1	22	WHT-RED		M2-6	M2-7	
41	MIL-W-16878/1	22	WHT-RED		M3-6	M3-7	
42	MIL-W-3861 TYPE S	20	BARE WIRE		XA2-M	XA2-S	1006776-20
43	MIL-W-3861 TYPE S	20	BARE WIRE		XA1-C	XA1-M	1006776-20
44	MIL-W-3861 TYPE S	20	BARE WIRE		E17	E18	
45	MIL-W-3861 TYPE S	20	BARE WIRE		E7	E8	

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP [illegible] TDRR 12537 DATE [illegible]	[illegible]	[illegible]


S2
XK4-11 — WHT-GY
T2-6 — WHT-YEL
T2-5 — WHT-ORN
A2
N
B6
B5
B4
A7
A3
24
B3
A4
B7
A5
A6
B1
B2
E2 — WHT-BLK-RED
M1-2 — WHT-BLK
E1 — WHT-BLK-BRN


(22) WHT-BLK-VIO - XK6-20
(22) WHT-BLK — XK6-14
(22) WHT-BLK-RED - XK6-17
(22) WHT-BLK-BRN - XK6-11
S1-4 — WHT-YEL (22)
S1-1 — WHT-ORN (22)
M3-6 — WHT-BRN (22)
40
M2 (TERMINAL BOARD LOCATED INSIDE OF COVER)
1
2
3
4
5
6
7
M1
+
S2-B1 - WHT-BLK
T2-3 - WHT-RED
S1
(22) WHT-ORN — M2-6
WHT-BLU-VIO — XK8-20
WHT-RED — T1-1
M2-5 — WHT-YEL (22)
M3-5 — WHT-BLU (22)
T1-2 — WHT-BLK-BRN
25
26
1010490-106 6 REQD REF
WHT-BLK — XK1-8
WHT — S5-C13
S7
WHT-BLK-YEL — XK3-1
WHT-BLK-VIO — XK8-1
WHT-YEL-GY — XK4-1
WHT-YEL — XK9-1
T1
WHT-RED — S1-2
T2-2 — WHT-BRN
WHT-BLK-BRN — S1-5
WHT-BLK — T2-1
1010490-108 2 REQD REF
M4
WHT-BLK — S8-B3
WHT-ORN — XDS1-2
S8-"A" DECK
S8-"B" DECK
32
WHT-YEL-BLU — XK1-1
WHT-GRN-GY — XK2-1
WHT-VIO-GY — S5-C13
WHT-BLU-GY — S9-C13
WHT-BLK — M4-1
WHT-YEL — XDS1-1
XK12-8 — WHT-BRN
XK12-5 — WHT-BLK
S7-A13 — WHT
S8-A13 — WHT-VIO-GY
S5-"A" DECK
S5-"B" DECK
S5-"C" DECK
31
30
27
28
29
S9-C5 — WHT-RED-GRN
XK12-1 — WHT-RED
XK11-8 — WHT-YEL-GRN
XK11-5 — WHT-ORN-GY
XK11-14 — WHT-YEL-VIO
XK11-11 — WHT-YEL-BLU
XK11-6 — WHT-ORN-BLU
XK11-3 — WHT-ORN-VIO
XK7-11 — WHT-GY
XK7-17 — WHT-VIO
XK11-12 — WHT-ORN-YEL
XK11-9 — WHT-ORN-GRN
XK7-9 — WHT-BLU
XK7-15 — WHT-GRN
S9-B13 — WHT-RED-ORN
S9-A13 — WHT-RED-GY
J6-r — WHT-BLK-RED
J1-L — WHT-YEL-GY
E26 — WHT-BLK
S3
CB1
T3-3 — WHT-BLK-BRN
XDS1-1 — WHT-BLK
J4-B — GY (16)
1010490-106 2 REQD REF
XDS1
M4-2 — WHT-ORN
T3-1 — WHT-BRN
CB1-2 — WHT-BLK
S8-B13 — WHT-YEL
(22) WHT-BRN — M2-7
(22) WHT-BLK-BRN - E37
(22) WHT-BLU — S1-4
(22) WHT-YEL-BLU - XK5-20
(22) WHT-YEL-GRN - XK5-14
(22) WHT-ORN-GY - XK5-17
(22) WHT-ORN-VIO - XK5-11
41
M3 (TERMINAL BOARD LOCATED INSIDE OF COVER)
S9-C13 — WHT-YEL-BLU
PS1-8 - WHT-RED-YEL (A)
S6
XK5-1 — WHT-YEL-VIO
XK6-1 — WHT-BRN-BLU
XK7-1 — WHT-BLK
S5-B1 — WHT-RED-GY
S9-"A" DECK
38
39
XA1-B — BLK/BLK
XA2-B — BLK/RED
S5-A1 — WHT-RED-ORN
S9-"B" DECK
36
37
E29 — WHT-BRN
E29 — WHT-RED
XK11-4 — WHT-BRN-ORN
XK11-10 — WHT-BRN-YEL
S6-A13 — WHT-YEL-BLU
S8-A13 — WHT-BLU-GY
S9-"C" DECK
33
34
35
S5-C2 — WHT-RED-GRN
WHT-BLK — R7-2
WHT-GY — E25
WHT-ORN — T3-6
R6
1
2
3

REFERENCE DRAWINGS:
1. SCHEMATIC DIAGRAM 1019711
2. HARNESS ASSY 1019738

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. [illegible] DATE [illegible]

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

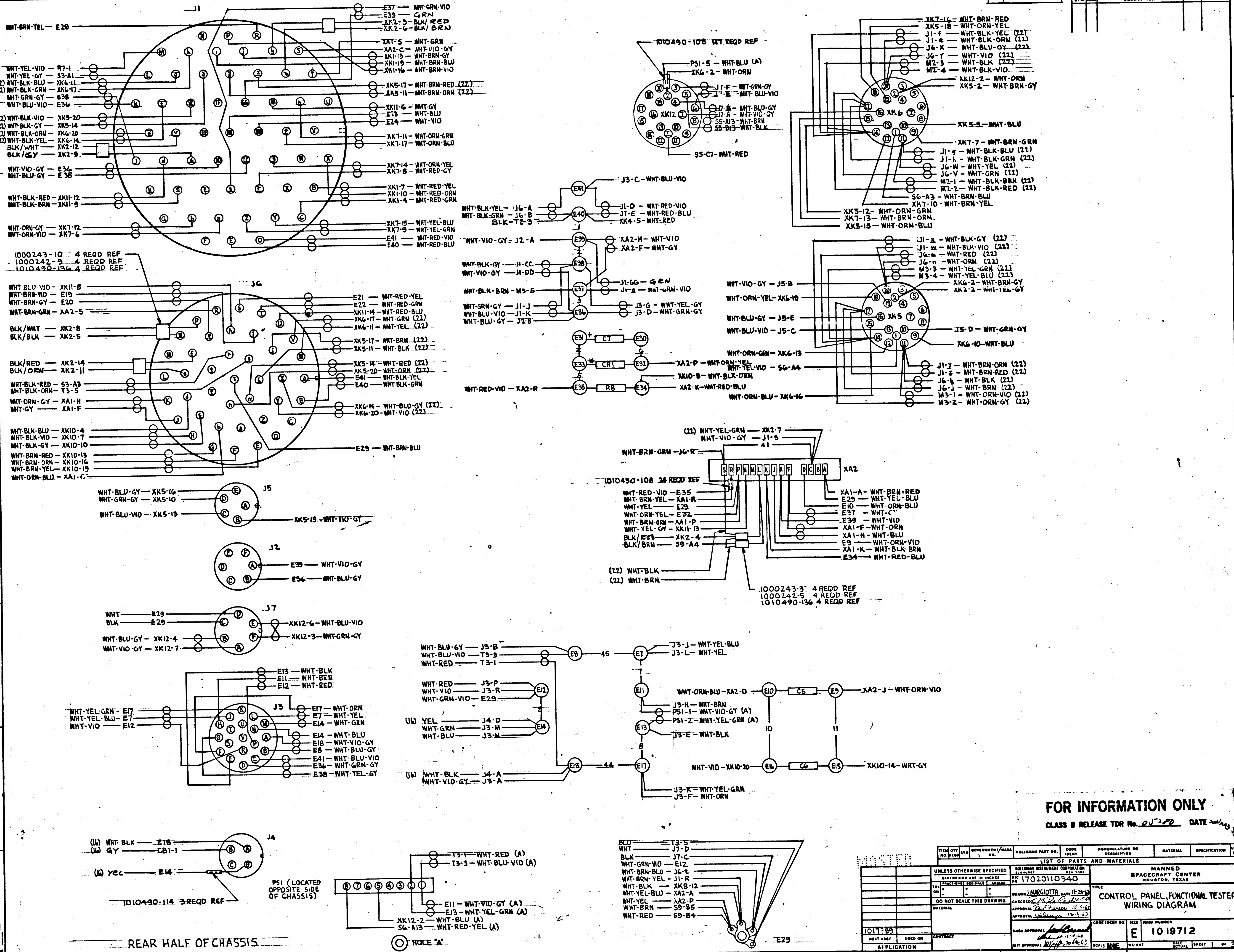
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340
DRAWN J. MARGIOTTA DATE 11-23-63
CHECKED R. M. De Carlo 12-5-63
APPROVAL [illegible] 12-5-63
APPROVAL [illegible]
NASA APPROVAL [illegible] 12-19-63
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER, WIRING DIAGRAM

CODE IDENT NO. | SIZE E | NASA NUMBER 1019712
SCALE NONE | WEIGHT | CALC ACTUAL | SHEET 3 OF 3

FRONT PANEL


J1
WHT-BRN-YEL – E29
WHT-YEL-VIO – R7-1
WHT-YEL-GY – S3-A1
(22) WHT-BLK-BLU – XK6-11
(22) WHT-BLK-GRN – XK6-17
WHT-GRN-GY – E38
WHT-BLU-VIO – E36
(22) WHT-BLK-VIO – XK5-20
(22) WHT-BLK-GY – XK5-14
(22) WHT-BLK-ORN – XK6-20
(22) WHT-BLK-YEL – XK6-14
BLK/WHT – XK2-12
BLK/GY – XK2-8
WHT-VIO-GY – E36
WHT-BLU-GY – E38
WHT-BLK-RED – XK11-12
WHT-BLK-BRN – XK11-9
WHT-ORN-GY – XK7-12
WHT-ORN-VIO – XK7-6
E37 – WHT-GRN-VIO
E39 – GRN
XK2-3 – BLK/RED
XK2-6 – BLK/BRN
XA1-5 – WHT-GRN
XA2-C – WHT-VIO-GY
XK1-13 – WHT-BRN-GY
XK1-19 – WHT-BRN-BLU
XK1-16 – WHT-BRN-VIO
XK5-17 – WHT-BRN-RED (22)
XK5-11 – WHT-BRN-ORN (22)
XK11-6 – WHT-GY
E23 – WHT-BLU
E24 – WHT-VIO
XK7-11 – WHT-ORN-GRN
XK7-17 – WHT-ORN-BLU
XK7-14 – WHT-ORN-YEL
XK7-8 – WHT-RED-GY
XK1-7 – WHT-RED-YEL
XK1-10 – WHT-RED-ORN
XK1-4 – WHT-RED-GRN
XK7-15 – WHT-YEL-BLU
XK7-9 – WHT-YEL-GRN
E41 – WHT-RED-VIO
E40 – WHT-RED-BLU
1000243-10 4 REQD REF
1000242-9 4 REQD REF
1010490-136 4 REQD REF
J6
WHT-BLU-VIO – XK11-8
WHT-BRN-VIO – E19
WHT-BRN-GY – E20
WHT-BRN-GRN – XA2-S
BLK/WHT – XK2-8
BLK/BLK – XK2-5
BLK/RED – XK2-14
BLK/ORN – XK2-11
WHT-BLK-RED – S3-A3
WHT-BLK-ORN – T3-5
WHT-ORN-GY – XA1-H
WHT-GY – XA1-F
WHT-BLK-BLU – XK10-4
WHT-BLK-VIO – XK10-7
WHT-BLK-GY – XK10-10
WHT-BRN-RED – XK10-13
WHT-BRN-ORN – XK10-16
WHT-BRN-YEL – XK10-19
WHT-ORN-BLU – XA1-C
E21 – WHT-RED-YEL
E22 – WHT-RED-GRN
XK11-14 – WHT-RED-BLU
XK6-17 – WHT-GRN (22)
XK6-11 – WHT-YEL (22)
XK5-17 – WHT-BRN (22)
XK5-11 – WHT-BLK (22)
XK5-14 – WHT-RED (22)
XK5-20 – WHT-ORN (22)
E41 – WHT-BLK-YEL
E40 – WHT-BLK-GRN
XK6-14 – WHT-BLU-GY (22)
XK6-20 – WHT-VIO (22)
E29 – WHT-BRN-BLU
J5
WHT-BLU-GY – XK5-16
WHT-GRN-GY – XK5-10
WHT-BLU-VIO – XK5-13
XK5-13 – WHT-VIO-GY
J2
E39 – WHT-VIO-GY
E36 – WHT-BLU-GY
J7
WHT – E29
BLK – E29
WHT-BLU-GY – XK12-4
WHT-VIO-GY – XK12-7
XK12-6 – WHT-BLU-VIO
XK12-3 – WHT-GRN-GY
J3
E13 – WHT-BLK
E11 – WHT-BRN
E12 – WHT-RED
WHT-YEL-GRN – E17
WHT-YEL-BLU – E7
WHT-VIO – E12
E17 – WHT-ORN
E7 – WHT-YEL
E14 – WHT-GRN
E14 – WHT-BLU
E18 – WHT-VIO-GY
E8 – WHT-BLU-GY
E41 – WHT-BLU-VIO
E36 – WHT-GRN-GY
E38 – WHT-YEL-GY
J4
(16) WHT-BLK – E18
(16) GY – CB1-1
(16) YEL – E14
1010490-114 3 REQD REF
PS1 (LOCATED OPPOSITE SIDE OF CHASSIS)
T3-1 – WHT-RED (A)
T3-3 – WHT-BLU-VIO (A)
E11 – WHT-VIO-GY (A)
E13 – WHT-YEL-GRN (A)
XK12-2 – WHT-BLU (A)
S6-A13 – WHT-RED-YEL (A)
REAR HALF OF CHASSIS
HOLE "A"
1010490-108 14 REQD REF
PS1-5 – WHT-BLU (A)
XK6-2 – WHT-ORN
J7-F – WHT-GRN-GY
J7-E – WHT-BLU-VIO
J7-B – WHT-BLU-GY
J7-A – WHT-VIO-GY
S5-A13 – WHT-BRN
S5-B13 – WHT-BLK
XK12
S5-C7 – WHT-RED
J3-C – WHT-BLU-VIO
WHT-BLK-YEL – J6-A
WHT-BLK-GRN – J6-B
BLK – T2-3
J1-D – WHT-RED-VIO
J1-E – WHT-RED-BLU
XK4-5 – WHT-RED
WHT-VIO-GY – J2-A
XA2-H – WHT-VIO
XA2-F – WHT-GY
WHT-BLK-GY – J1-CC
WHT-VIO-GY – J1-DD
J1-GG – GRN
J1-a – WHT-GRN-VIO
WHT-BLK-BRN – M3-5
WHT-GRN-GY – J1-J
WHT-BLU-VIO – J1-K
WHT-BLU-GY – J2-B
J3-G – WHT-YEL-GY
J3-D – WHT-GRN-GY
E41
E40
E39
E38
E37
E36
E31
E30
E33
E32
E35
E34
C7
CR1
R8
XA2-P – WHT-ORN-YEL
XK10-8 – WHT-BLK-ORN
WHT-RED-VIO – XA2-R
XA2-K – WHT-RED-BLU
XK7-16 – WHT-BRN-RED
XK5-18 – WHT-ORN-YEL
J1-f – WHT-BLK-YEL (22)
J1-e – WHT-BLK-ORN (22)
J6-X – WHT-BLU-GY (22)
J6-Y – WHT-VIO (22)
M2-3 – WHT-BLK (22)
M2-4 – WHT-BLK-VIO
XK12-2 – WHT-ORN
XK5-2 – WHT-BRN-GY
XK6
XK5-9 – WHT-BLU
XK7-7 – WHT-BRN-GRN
J1-g – WHT-BLK-BLU (22)
J1-h – WHT-BLK-GRN (22)
J6-W – WHT-YEL (22)
J6-V – WHT-GRN (22)
M2-1 – WHT-BLK-BRN (22)
M2-2 – WHT-BLK-RED (22)
S6-A3 – WHT-BRN-BLU
XK7-10 – WHT-BRN-YEL
XK5-12 – WHT-ORN-GRN
XK7-13 – WHT-BRN-ORN
XK5-15 – WHT-ORN-BLU
J1-x – WHT-BLK-GY (22)
J1-w – WHT-BLK-VIO (22)
J6-m – WHT-RED (22)
J6-n – WHT-ORN (22)
M3-3 – WHT-YEL-GRN (22)
M3-4 – WHT-YEL-BLU (22)
XK6-2 – WHT-BRN-GY
XK2-2 – WHT-YEL-GY
WHT-VIO-GY – J5-B
WHT-ORN-YEL – XK6-19
WHT-BLU-GY – J5-E
WHT-BLU-VIO – J5-C
XK5
J5-D – WHT-GRN-GY
XK6-10 – WHT-BLU
WHT-ORN-GRN – XK6-13
WHT-YEL-VIO – S6-A4
WHT-ORN-BLU – XK6-16
J1-y – WHT-BRN-ORN (22)
J1-z – WHT-BRN-RED (22)
J6-k – WHT-BLK (22)
J6-j – WHT-BRN (22)
M3-1 – WHT-ORN-VIO (22)
M3-2 – WHT-ORN-GY (22)
(22) WHT-YEL-GRN – XK2-7
WHT-VIO-GY – J1-S
41
WHT-BRN-GRN – J6-R
S R P N M L K J H F D C B A
XA2
1010490-108 24 REQD REF
WHT-RED-VIO – E35
WHT-BRN-YEL – XA1-R
WHT-YEL – E29
WHT-ORN-YEL – E32
WHT-BRN-ORN – XA1-P
WHT-YEL-GY – XK11-13
BLK/BLU – XK2-4
BLK/BRN – S9-A4
XA1-A – WHT-BRN-RED
E29 – WHT-YEL-BLU
E10 – WHT-ORN-BLU
E37 – WHT-C
E39 – WHT-VIO
XA1-F – WHT-ORN
XA1-H – WHT-BLU
E9 – WHT-ORN-VIO
XA1-K – WHT-BLK-BRN
E34 – WHT-RED-BLU
(22) WHT-BLK
(22) WHT-BRN
1000243-3 4 REQD REF
1000242-5 4 REQD REF
1010490-136 4 REQD REF
WHT-BLU-GY – J3-B
WHT-BLU-VIO – T3-3
WHT-RED – T3-1
E6
45
E7
J3-J – WHT-YEL-BLU
J3-L – WHT-YEL
7
WHT-RED – J3-P
WHT-VIO – J3-R
WHT-GRN-VIO – E29
E12
E11
WHT-ORN-BLU – XA2-D
E10
C5
E9
XA2-J – WHT-ORN-VIO
J3-H – WHT-BRN
PS1-1 – WHT-VIO-GY (A)
PS1-2 – WHT-YEL-GRN (A)
(16) YEL – J4-D
WHT-GRN – J3-M
WHT-BLU – J3-N
E14
E13
J3-E – WHT-BLK
10
11
8
(16) WHT-BLK – J4-A
WHT-VIO-GY – J3-A
E18
44
E17
WHT-VIO – XK10-20
E16
C6
E15
XK10-14 – WHT-GY
J3-K – WHT-YEL-GRN
J3-F – WHT-ORN
BLU – T3-5
WHT – J7-D
BLK – J7-C
WHT-GRN-VIO – E12
WHT-BRN-BLU – J6-t
WHT-BRN-YEL – J1-R
WHT-BLK – XK8-12
WHT-YEL-BLU – XA2-A
WHT-YEL – XA2-P
WHT-BRN – S9-B5
WHT-RED – S9-B4
E29
10 9 8 7 6 5 4 3 2 1
H G F E D C B A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05-280 DATE 20/12/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

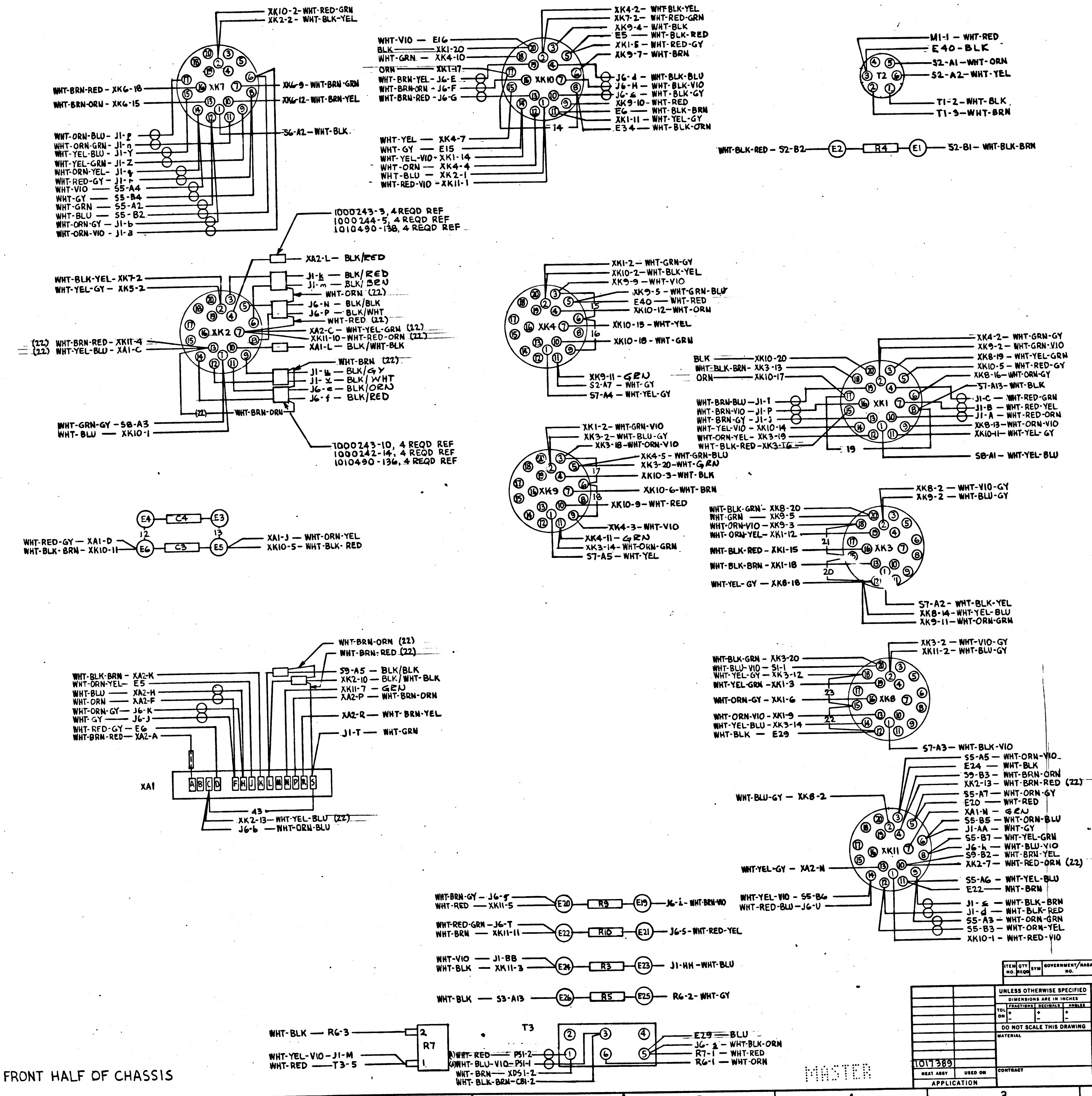
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340
DRAWN J MARGIOTTA DATE 11-29-63
CHECKED R. M. De Carlo 12-5-63
APPROVAL Ray Ferren 12-5-63
APPROVAL 12-9-63
NASA APPROVAL 12-19-63
MIT APPROVAL W Kupfer 20 Dec 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER, WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019712
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 3

PHOTOGRAPHIC SCALE ONLY


XK10-2 — WHT-RED-GRN
XK2-2 — WHT-BLK-YEL
XK7
WHT-BRN-RED - XK6-18
WHT-BRN-ORN - XK6-15
XK6-9 - WHT-BRN-GRN
XK6-12 - WHT-BRN-YEL
S6-A2 — WHT-BLK
WHT-ORN-BLU - J1-p
WHT-ORN-GRN - J1-n
WHT-YEL-BLU - J1-Y
WHT-YEL-GRN - J1-Z
WHT-ORN-YEL - J1-q
WHT-RED-GY - J1-r
WHT-VIO — S5-A4
WHT-GY — S5-B4
WHT-GRN — S5-A2
WHT-BLU — S5-B2
WHT-ORN-GY - J1-b
WHT-ORN-VIO - J1-a
XK4-2 — WHT-BLK-YEL
XK7-2 — WHT-RED-GRN
XK9-4 — WHT-BLK
E5 — WHT-BLK-RED
XK1-5 — WHT-RED-GY
XK9-7 — WHT-BRN
WHT-VIO — E16
BLK — XK1-20
WHT-GRN — XK4-10
ORN — XK1-17
WHT-BRN-YEL - J6-E
WHT-BRN-ORN - J6-F
WHT-BRN-RED - J6-G
XK10
J6-d — WHT-BLK-BLU
J6-H — WHT-BLK-VIO
J6-c — WHT-BLK-GY
XK9-10 — WHT-RED
E6 — WHT-BLK-BRN
XK1-11 — WHT-YEL-GY
E34 — WHT-BLK-ORN
14
WHT-YEL — XK4-7
WHT-GY — E15
WHT-YEL-VIO - XK1-14
WHT-ORN — XK4-4
WHT-BLU — XK2-1
WHT-RED-VIO - XK11-1
M1-1 — WHT-RED
E40 - BLK
S2-A1 — WHT-ORN
S2-A2 — WHT-YEL
T2
T1-2 — WHT-BLK
T1-3 — WHT-BRN
WHT-BLK-RED — S2-B2
E2
R4
E1
S2-B1 — WHT-BLK-BRN
1000243-3, 4 REQD REF
1000244-5, 4 REQD REF
1010490-138, 4 REQD REF
XA2-L — BLK/RED
WHT-BLK-YEL - XK7-2
WHT-YEL-GY — XK5-2
J1-k — BLK/RED
J1-m — BLK/GRN
WHT-ORN (22)
J6-N — BLK/BLK
J6-P — BLK/WHT
WHT-RED (22)
XK2
XA2-C — WHT-YEL-GRN (22)
XK11-10 - WHT-RED-ORN (22)
XA1-L — BLK/WHT-BLK
(22) WHT-BRN-RED - XK11-4
(22) WHT-YEL-BLU - XA1-C
WHT-BRN (22)
J1-u — BLK/GY
J1-x — BLK/WHT
J6-e — BLK/ORN
J6-f — BLK/RED
(22)
WHT-BRN-ORN
WHT-GRN-GY - S8-A3
WHT-BLU — XK10-1
1000243-10, 4 REQD REF
1000242-14, 4 REQD REF
1010490-136, 4 REQD REF
XK1-2 — WHT-GRN-GY
XK10-2 — WHT-BLK-YEL
XK9-9 — WHT-VIO
XK9-5 — WHT-GRN-BLU
E40 — WHT-RED
XK10-12 - WHT-ORN
15
XK4
XK10-13 — WHT-YEL
16
XK10-18 — WHT-GRN
XK9-11 - GRN
S2-A7 — WHT-GY
S7-A4 — WHT-YEL-GY
XK1-2 — WHT-GRN-VIO
XK3-2 — WHT-BLU-GY
XK3-18 - WHT-ORN-VIO
XK4-5 - WHT-GRN-BLU
XK3-20 - WHT-GRN
17
XK10-3 - WHT-BLK
XK9
18
XK10-6 - WHT-BRN
XK10-9 — WHT-RED
XK4-3 - WHT-VIO
XK4-11 — GRN
XK3-14 - WHT-ORN-GRN
S7-A5 — WHT-YEL
XK4-2 — WHT-GRN-GY
XK9-2 — WHT-GRN-VIO
XK8-19 — WHT-YEL-GRN
XK10-5 — WHT-RED-GY
XK8-16 - WHT-ORN-GY
S7-A13 - WHT-BLK
BLK — XK10-20
WHT-BLK-BRN - XK3-13
ORN — XK10-17
WHT-BRN-BLU - J1-1
WHT-BRN-VIO - J1-P
WHT-BRN-GY - J1-J
WHT-YEL-VIO - XK10-14
WHT-ORN-YEL - XK3-19
WHT-BLK-RED - XK3-16
XK1
J1-C — WHT-RED-GRN
J1-B — WHT-RED-YEL
J1-A — WHT-RED-ORN
XK8-13 - WHT-ORN-VIO
XK10-11 - WHT-YEL-GY
19
S8-A1 — WHT-YEL-BLU
XK8-2 — WHT-VIO-GY
XK9-2 — WHT-BLU-GY
WHT-BLK-GRN - XK8-20
WHT-GRN — XK9-5
WHT-ORN-VIO — XK9-3
WHT-ORN-YEL - XK1-12
21
XK3
WHT-BLK-RED - XK1-15
WHT-BLK-BRN - XK1-18
20
WHT-YEL-GY — XK8-18
S7-A2 - WHT-BLK-YEL
XK8-14 - WHT-YEL-BLU
XK9-11 - WHT-ORN-GRN
E4
C4
E3
12
13
WHT-RED-GY — XA1-D
WHT-BLK-BRN - XK10-11
E6
C3
E5
XA1-J — WHT-ORN-YEL
XK10-5 — WHT-BLK-RED
WHT-BRN-ORN (22)
WHT-BRN-RED (22)
WHT-BLK-BRN - XA2-K
WHT-ORN-YEL — E5
WHT-BLU — XA2-H
WHT-ORN — XA2-F
WHT-GRN — J6-K
WHT-GY — J6-J
WHT-RED-GY — E6
WHT-BRN-RED — XA2-A
S9-A5 — BLK/BLK
XK2-10 — BLK/WHT-BLK
XK11-7 — GRN
XA2-P — WHT-BRN-ORN
XA2-R — WHT-BRN-YEL
J1-T — WHT-GRN
XA1
A B C D F H J K L M N P R S
43
XK2-13 - WHT-YEL-BLU (22)
J6-b — WHT-ORN-BLU
XK3-2 — WHT-VIO-GY
XK11-2 — WHT-BLU-GY
WHT-BLK-GRN - XK3-20
WHT-BLU-VIO — S1-1
WHT-YEL-GY — XK3-12
WHT-YEL-GRN - XK1-3
23
WHT-ORN-GY — XK1-6
XK8
WHT-ORN-VIO - XK1-9
22
WHT-YEL-BLU - XK3-14
WHT-BLK — E29
S7-A3 — WHT-BLK-VIO
S5-A5 — WHT-ORN-VIO
E24 — WHT-BLK
S9-B3 — WHT-BRN-ORN
XK2-13 — WHT-BRN-RED (22)
S5-A7 — WHT-ORN-GY
E20 — WHT-RED
XA1-N — GRN
S5-B5 — WHT-ORN-BLU
J1-AA — WHT-GY
S5-B7 — WHT-YEL-GRN
J6-h — WHT-BLU-VIO
S9-B2 — WHT-BRN-YEL
XK2-7 — WHT-RED-ORN (22)
WHT-BLU-GY — XK8-2
WHT-YEL-GY — XA2-N
XK11
S5-A6 — WHT-YEL-BLU
E22 — WHT-BRN
WHT-YEL-VIO — S5-B6
WHT-RED-BLU - J6-U
J1-s — WHT-BLK-BRN
J1-d — WHT-BLK-RED
S5-A3 — WHT-ORN-GRN
S5-B3 — WHT-ORN-YEL
XK10-1 - WHT-RED-VIO
WHT-BRN-GY — J6-s
WHT-RED — XK11-5
E20
R9
E19
J6-i - WHT-BRN-VIO
WHT-RED-GRN — J6-T
WHT-BRN — XK11-11
E22
R10
E21
J6-S - WHT-RED-YEL
WHT-VIO — J1-BB
WHT-BLK — XK11-3
E24
R3
E23
J1-HH - WHT-BLU
WHT-BLK — S3-A13
E26
R5
E25
R6-2 - WHT-GY
WHT-BLK — R6-3
WHT-YEL-VIO - J1-M
WHT-RED — T3-5
R7
T3
WHT-RED — PS1-2
WHT-BLU-VIO — PS1-1
WHT-BRN — XDS1-2
WHT-BLK-BRN-CB1-2
E29 — BLU
J6-z — WHT-BLK-ORN
R7-1 — WHT-RED
R6-1 — WHT-ORN
MASTER

FRONT HALF OF CHASSIS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01280 DATE 20 Dec 63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

NEXT ASSY	USED ON
1017389	

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340

DRAWN L MARGIOTTA DATE 11-23-63
CHECKED R.M. DeCarlo 12-5-63
APPROVAL Roy Ferren 12-5-63
APPROVAL 12-9-63
NASA APPROVAL 12-19-63
MIT APPROVAL 20 Dec 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING DIAGRAM

CODE IDENT NO. SIZE E NASA NUMBER 1019712
SCALE NONE WEIGHT CALC ACTUAL SHEET 2 OF 3

1019712

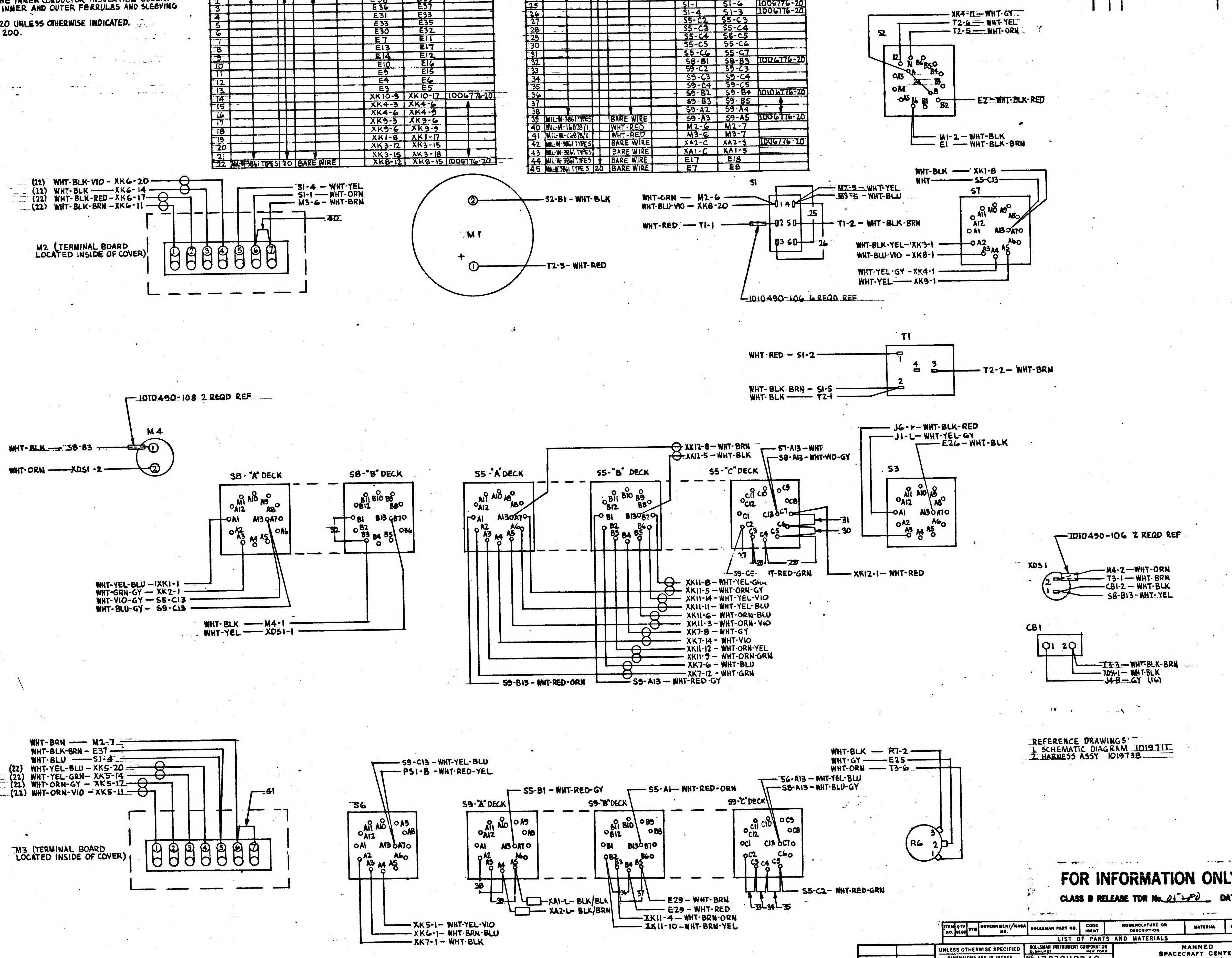
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
3. ▭ SYMBOL INDICATES INNER AND OUTER FERRULES AND SLEEVING
4. WIRE PER KES-1015W.1.
5. ALL WIRE TO BE AWG NO. 20 UNLESS OTHERWISE INDICATED.
6. SOLDER PER KPS-1006S.200.

COND NO.	PART NO. REF	AWG SIZE	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	MIL-W-3861 TYPE S	20	BARE WIRE		E39	E40	
2	↑	↑	↑		E38	E39	
3					E36	E37	
4					E31	E33	
5					E33	E35	
6					E30	E32	
7					E7	E11	
8					E13	E17	
9					E14	E12	
10					E10	E16	
11					E9	E15	
12					E4	E6	
13					E3	E5	
14					XK10-8	XK10-17	1006776-20
15					XK4-3	XK4-6	↑
16					XK4-6	XK4-9	
17					XK9-3	XK9-6	
18					XK9-6	XK9-9	
19					XK1-8	XK1-17	
20					XK3-12	XK3-15	
21	↓	↓	↓		XK3-15	XK3-18	↓
22	MIL-W-3861 TYPE S	20	BARE WIRE		XK8-12	XK8-15	1006776-20

COND NO.	PART NO. REF	AWG SIZE	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
23	MIL-W-3861 TYPE S	20	BARE WIRE		XK8-15	XK8-18	1006776-20
24	↑	↑	↑		S2-B7	S2-A7	
25					S1-1	S1-6	1006776-20
26					S1-4	S1-3	1006776-20
27					S5-C2	S5-C3	
28					S5-C3	S5-C4	
29					S5-C4	S5-C5	
30					S5-C5	S5-C6	
31					S5-C6	S5-C7	
32					S8-B1	S8-B3	1006776-20
33					S9-C2	S9-C3	
34					S9-C3	S9-C4	
35					S9-C4	S9-C5	
36					S9-B2	S9-B4	1010106776-20
37					S9-B3	S9-B5	↑
38	↓		↓		S9-A2	S9-A4	↓
39	MIL-W-3861 TYPE S		BARE WIRE		S9-A3	S9-A5	1006776-20
40	MIL-W-16878/1		WHT-RED		M2-6	M2-7	
41	MIL-W-16878/1		WHT-RED		M3-6	M3-7	
42	MIL-W-3861 TYPE S		BARE WIRE		XA2-C	XA2-S	1006776-20
43	MIL-W-3861 TYPE S		BARE WIRE		XA1-C	XA1-S	
44	MIL-W-3861 TYPE S	↓	BARE WIRE		E17	E18	
45	MIL-W-3861 TYPE S	20	BARE WIRE		E7	E8	

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS


S2
XK4-11 — WHT-GY
T2-6 — WHT-YEL
T2-5 — WHT-ORN
E2 — WHT-BLK-RED
M1-2 — WHT-BLK
E1 — WHT-BLK-BRN
(22) WHT-BLK-VIO — XK6-20
(22) WHT-BLK — XK6-14
(22) WHT-BLK-RED — XK6-17
(22) WHT-BLK-BRN — XK6-11
S1-4 — WHT-YEL
S1-1 — WHT-ORN
M3-6 — WHT-BRN
40
M2 (TERMINAL BOARD LOCATED INSIDE OF COVER)
M1
S2-B1 — WHT-BLK
T2-3 — WHT-RED
S1
WHT-ORN — M2-6
WHT-BLU-VIO — XK8-20
WHT-RED — T1-1
M2-5 — WHT-YEL
M3-5 — WHT-BLU
25
26
T1-2 — WHT-BLK-BRN
1010490-106 6 REQD REF
WHT-BLK — XK1-8
WHT — S5-C13
S7
WHT-BLK-YEL — XK3-1
WHT-BLU-VIO — XK8-1
WHT-YEL-GY — XK4-1
WHT-YEL — XK9-1
T1
WHT-RED — S1-2
WHT-BLK-BRN — S1-5
WHT-BLK — T2-1
T2-2 — WHT-BRN
1010490-108 2 REQD REF
M4
WHT-BLK — S8-B3
WHT-ORN — XDS1-2
S8-"A" DECK
S8-"B" DECK
32
WHT-YEL-BLU — XK1-1
WHT-GRN-GY — XK2-1
WHT-VIO-GY — S5-C13
WHT-BLU-GY — S9-C13
WHT-BLK — M4-1
WHT-YEL — XDS1-1
XK12-8 — WHT-BRN
XK12-5 — WHT-BLK
S7-A13 — WHT
S8-A13 — WHT-VIO-GY
S5-"A" DECK
S5-"B" DECK
S5-"C" DECK
31
30
27
28
29
S9-C5 — WHT-RED-GRN
XK12-1 — WHT-RED
XK11-8 — WHT-YEL-GRN
XK11-5 — WHT-ORN-GY
XK11-14 — WHT-YEL-VIO
XK11-11 — WHT-YEL-BLU
XK11-6 — WHT-ORN-BLU
XK11-3 — WHT-ORN-VIO
XK7-8 — WHT-GY
XK7-14 — WHT-VIO
XK11-12 — WHT-ORN-YEL
XK11-9 — WHT-ORN-GRN
XK7-6 — WHT-BLU
XK7-12 — WHT-GRN
S9-B13 — WHT-RED-ORN
S9-A13 — WHT-RED-GY
J6-r — WHT-BLK-RED
J1-L — WHT-YEL-GY
E26 — WHT-BLK
S3
1010490-106 2 REQD REF
XDS1
M4-2 — WHT-ORN
T3-1 — WHT-BRN
CB1-2 — WHT-BLK
S8-B13 — WHT-YEL
CB1
T3-3 — WHT-BLK-BRN
XDS1-1 — WHT-BLK
J4-B — GY (16)
WHT-BRN — M2-7
WHT-BLK-BRN — E37
WHT-BLU — S1-4
(22) WHT-YEL-BLU — XK5-20
(22) WHT-YEL-GRN — XK5-14
(22) WHT-ORN-GY — XK5-17
(22) WHT-ORN-VIO — XK5-11
41
M3 (TERMINAL BOARD LOCATED INSIDE OF COVER)
S9-C13 — WHT-YEL-BLU
PS1-8 — WHT-RED-YEL
S6
XK5-1 — WHT-YEL-VIO
XK6-1 — WHT-BRN-BLU
XK7-1 — WHT-BLK
S5-B1 — WHT-RED-GY
S9-"A" DECK
38
39
XA1-L — BLK/BLK
XA2-L — BLK/BRN
S5-A1 — WHT-RED-ORN
S9-"B" DECK
36
37
E29 — WHT-BRN
E29 — WHT-RED
XK11-4 — WHT-BRN-ORN
XK11-10 — WHT-BRN-YEL
S6-A13 — WHT-YEL-BLU
S8-A13 — WHT-BLU-GY
S9-"C" DECK
33
34
35
S5-C2 — WHT-RED-GRN
WHT-BLK — R7-2
WHT-GY — E25
WHT-ORN — T3-6
R6

REFERENCE DRAWINGS
1. SCHEMATIC DIAGRAM 1019711
2. HARNESS ASSY 1019738

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 01-280 **DATE** 20 Dec

FRONT PANEL

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110340
DRAWN J. MARGIOTTA DATE 11-23-63
CHECKED R.M. DeCarlo 12-5-63
APPROVAL 12-5-63
APPROVAL 12-5-63
NASA APPROVAL 12-16-63
MIT APPROVAL 20 Dec 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

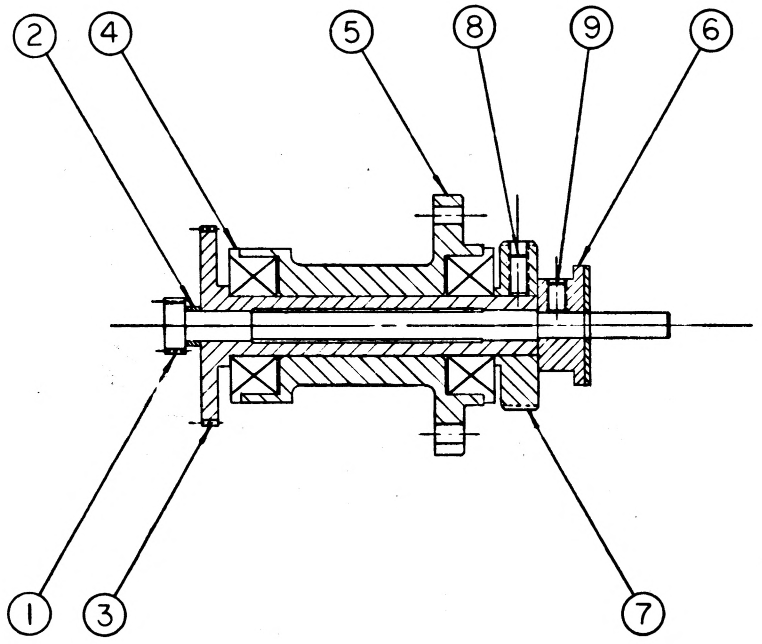
TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019712
SCALE NONE
WEIGHT
CALC / ACTUAL
SHEET 3 OF 3

1019713

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2-IDENTIFY USING NASA DWG NO., REVISION & MANUFACTURER'S SYMBOL PER ND 1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 43651 DATE 10/9/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2			74 45502 9012		SETSCREW, SELF LOCKING, HEX. SOCKET			
8	2			74 45502 9013		SETSCREW, SELF LOCKING, HEX SOCKET			
7	1		1019039	16 020110280		ADAPTER, COARSE KNOB			
6	1		1017407	17 020110200		CLUTCH SPACER, ASS'Y OF			
5	1		1019037	16 020110260		HOUSING, BEARING			
4	2			3027150 0240		BEARING, BALL ANNULAR FLANGED			
3	1		1019042	16 020110310		GEAR HOUSING			
2	1		1019038	16 020110270		SPACER, GEAR SHAFT 120T/96P			
1	1		1019065	16 020110530		GEAR SHAFT, SPUR 30T/96P			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± / DECIMALS ± / ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110350

DRAWN W. GARNELL DATE 9-25-63
CHECKED Earl Sargent 10-8-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W J Rhine 10-8-63
10/9/63
MIT APPROVAL 10/9/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
FINE & COARSE ADJUST., ASS'Y OF

CODE IDENT NO.
SIZE D
NASA NUMBER 1019713
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019713

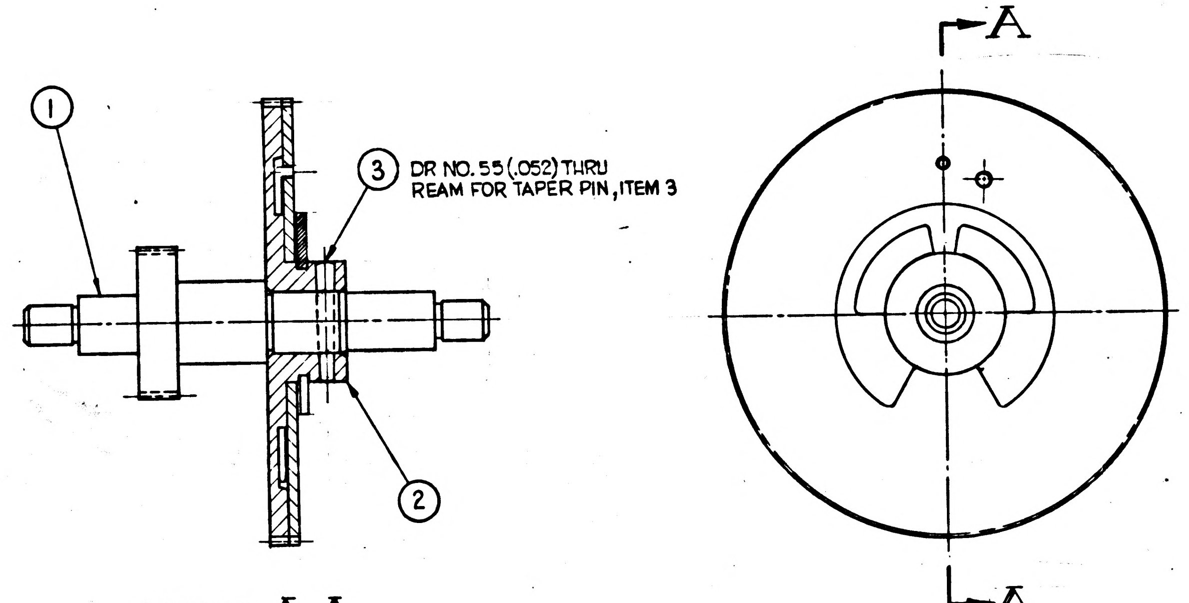
E-100

1019714

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY USING DWG NO., REVISION LETTER & MANUFACTURER'S SYMB PER ND1002019.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03651 DATE 10/8/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		MS24692-27	73002305020		PIN, TAPER (7/0 x 3/8 LG)			
2	1		1019705	17020110270		GEAR ASSY, ANTIBACKLASH			
1	1		1019069	16020110570		SHAFT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —//— DECIMALS ± —//— ANGLES ± —//—
DO NOT SCALE THIS DRAWING
MATERIAL —//—
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110360
DRAWN C. BORSODY DATE 9-26-63
CHECKED John W. Bagio 10-3-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL W. J. Rhine 10-8-63
W Schmidt 10/7/63
MIT APPROVAL 10/8/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSY, GEAR
(PINION: 44T/96P, GEAR: 132T/96P) (S5)

CODE IDENT NO. SIZE D NASA NUMBER 1019714
SCALE WEIGHT CALC ACTUAL SHEET 1 OF 1

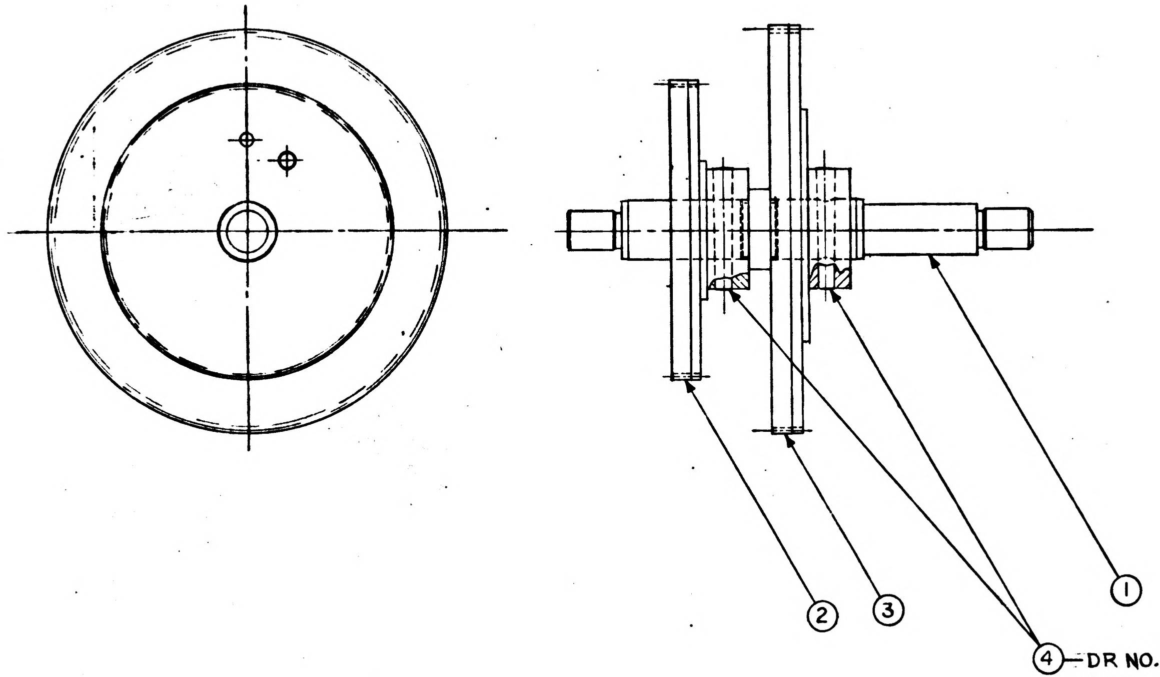
MASTER

1019714

1019715

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURER'S SYMBOL PER NO.1002019.



④—DR NO.55(.052) THRU
REAM FOR TAPER PIN.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 03657 **DATE** 10/8/63

MASTER

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		MS24692-27	73002305020		PIN, TAPER (7/0 × 3/8 LG)			
3	1		1017391	17020110050		GEAR ASSEMBLY, ANTI-BACKLASH (120T/96P)			
2	1		1019707	17020110290		GEAR ASSEMBLY, ANTI-BACKLASH (88T/96P)			
1	1		1019024	16020110130		SHAFT, GEAR, SPUR (S2)			

NEXT ASSY	USED ON
1019716	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110370

DRAWN A.L. Rhodes DATE 9-26-63
CHECKED 10-4-63
APPROVAL
APPROVAL 10-3-63
NASA APPROVAL 10-8-63
10-7-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLUSTER ASSEMBLY,
GEAR (S2)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019715
SCALE 4:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

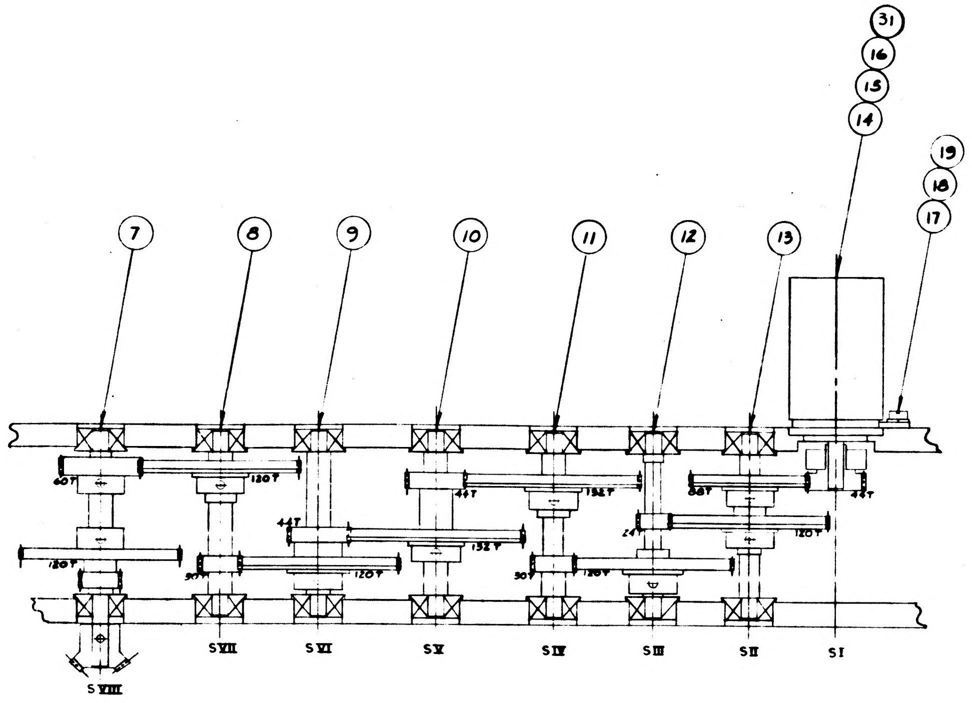
1019715

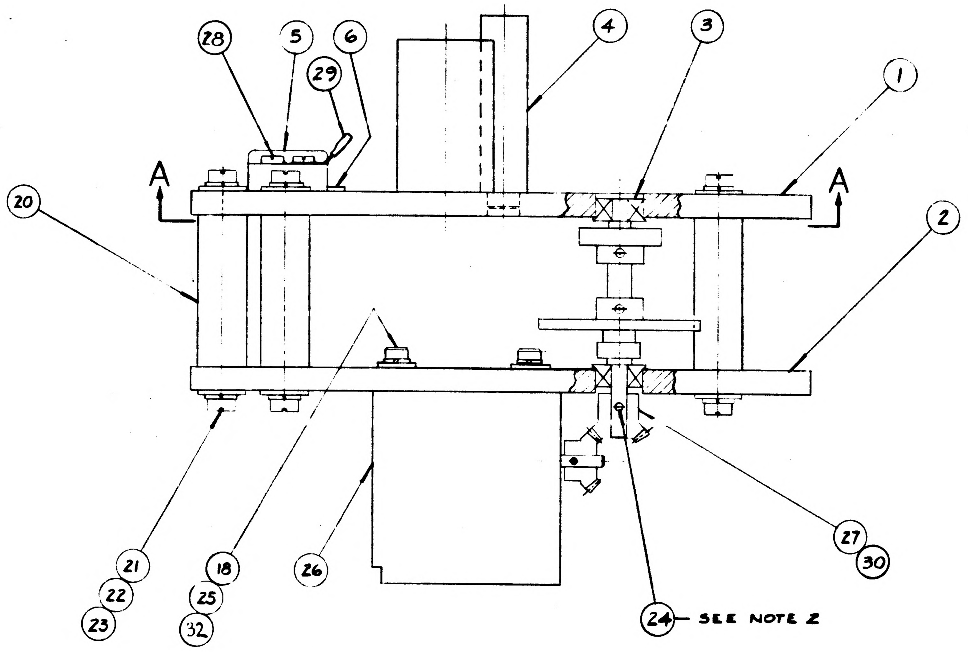
E-100

B 1019716

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE ECP# 105131 FOR CHANGES	12-3-63 C B	
B		REVISED PER ECP 106197 TDRR 12344 DATE 9/8/64		

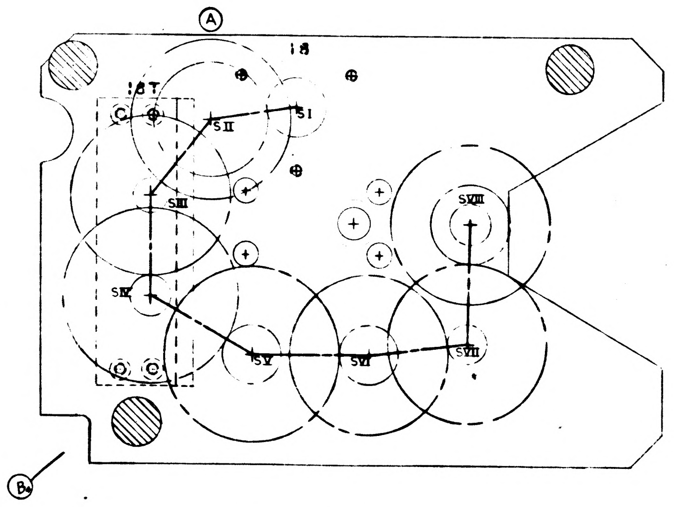
NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. DR NO 61 (.0390) THRU, REAM FOR TAPER PIN
3. SEE SCHEMATIC DWG NASA 1019719, KIC 17 02011 0390
4. IDENTIFY USING NASA PART NO. REV. LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.





WIRING LEGEND

FROM RESOLVER	TO TERMINAL BOARD
B1 - RED (S1)	TB1 - 1
B1 - BLK (S3)	TB1 - 2
B1 - YEL (S2)	TB1 - 3
B1 - BLU (S4)	TB1 - 4
B1 - RED (P1)	TB1 - 5
B1 - YEL (P2)	TB1 - 6
B1 - BLK (P3)	TB1 - 7



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04143 DATE 10/24/60

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
32	4		AN960C-3	74 46805 1001		WASHER, FLAT			
31	1		NAS1351C02-4			SCREW, CAP, SOC. HD			
30	1		1017425-5	74 45502 9005		SCREW, SET			
29	7		MS25036-43	68 10100 2309		TERMINAL, LUG, INSULATED			
28	4		MS35233-5	74 45505 4005		SCREW, MACHINE, PAN HEAD. SLOTTED			
27	1		1019031	16020110200		GEAR, BEVEL, STRAIGHT (24T/48P)			
26	1		1017405	17020110180		ANGLE COUNTER, ASSY OF			
25	4		NAS1352C02-6			SCREW, CAP, SOCKET, HD			
24	1		1017426-18	73 00230 5011		PIN, PLAIN, TAPER			
23	6		NAS1352C06-8			SCREW, SOCKET HD CAP			
22	6		MS15795-306			WASHER, FLAT			
21	6		MS35337-79	74 43905 0003		WASHER, LOCK, SPLIT, HELICAL			
20	3		1019075	16020110640		POST			
19	3		NAS1352C02-4			SCREW, SOCKET HD CAP			
18	7		MS35337-77	74 43903 0001		WASHER, LOCK, SPLIT, HELICAL			
17	3		1011868-3	54 38690 0332		CLAMP, SYNCH.			
16	1		1019068	16020110380		GEAR, SPUR, SPLIT HUB			
15	1		1019035	16020110240		CLAMP, COLLAR			
14	1		1010428			RESOLVER			
13	1		1019715	17020110370		CLUSTER ASSY, GEAR (S II)			
12	1		1019704	17020110260		CLUSTER ASSY, GEAR (S III)			
11	1		1019710	17020110320		CLUSTER ASSY, GEAR (S IV)			
10	1		1019714	17020110360		CLUSTER ASSY, GEAR (S V)			
9	1		1019709	17020110310		CLUSTER ASSY, GEAR (S VI)			
8	1		1019708	17020110300		CLUSTER ASSY, GEAR (S VII)			
7	1		1019706	17020110280		CLUSTER ASSY, GEAR (S VIII)			
6	1		1019085-6	7444701900 6		STRIP, MARKER			
5	1		1017485-6	68 10200 2406		TERMINAL BOARD (BARRIER TYPE)			
4	1		1019074	16020110630		POST			
3	14		1010356-15	30 24660 0080		BEARING, BALL, ANNULAR, FLANGED. (D.S.)			
2	1		1019022	16020110110		PLATE, GEAR (LOWER)			
1	1		1019021	16020110100		PLATE, GEAR (UPPER)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 02011 0380

DRAWN M. GARNELL DATE 10-4-63
CHECKED [illegible] 10-21-63
APPROVAL [illegible] 10-21-63
APPROVAL
NASA APPROVAL [illegible] 12-23-63
MIT APPROVAL [illegible]

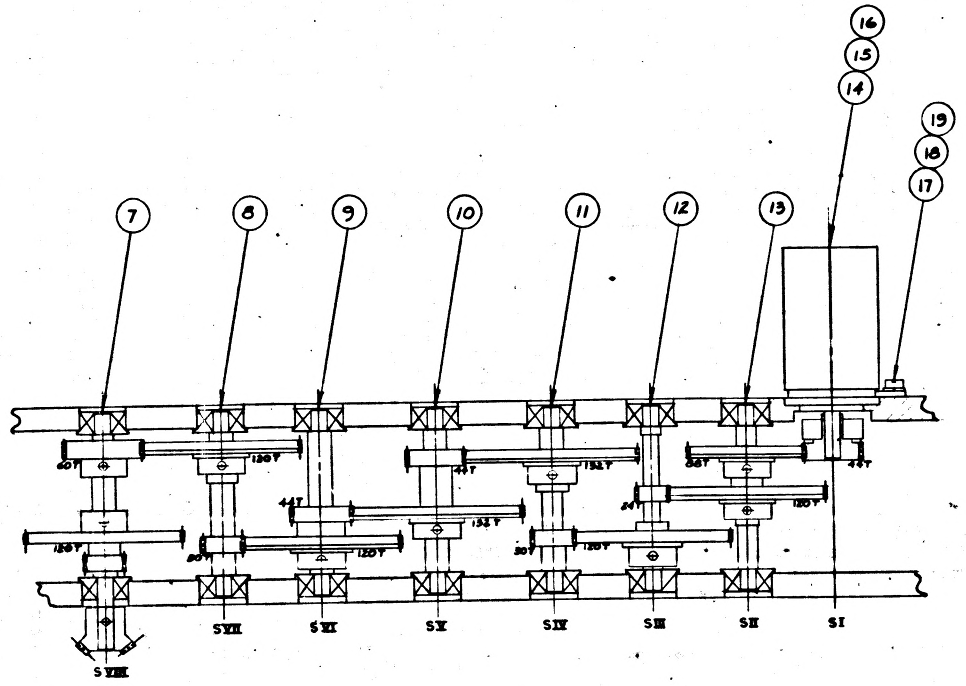
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

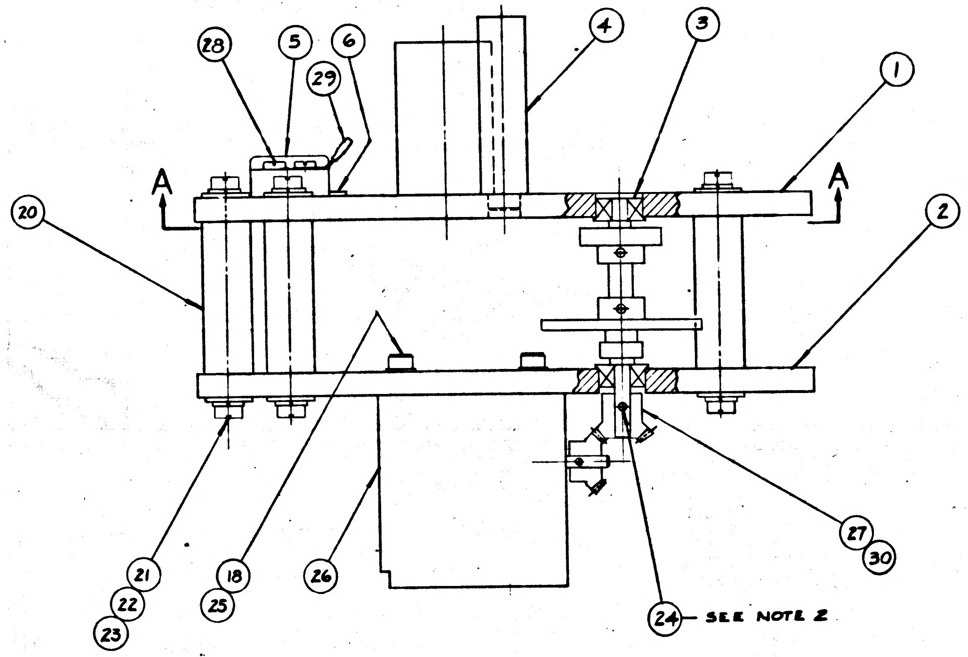
TITLE
INDICATOR ANGLE
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019716
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

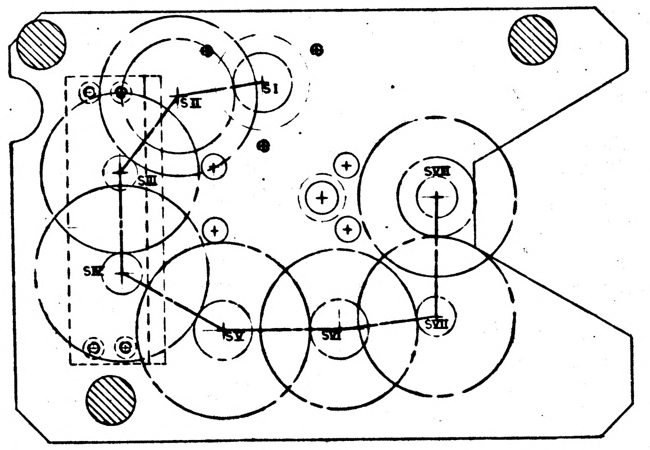
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. DR NO 61 (.0390) THRU, REAM FOR TAPER PIN
3. SEE SCHEMATIC DWG NASA 1019719, KIC 17 02011 0390





WIRING LEGEND	
FROM RESOLVER	TO TERMINAL BOARD
B1 - RED (S1)	TB1 - 1
B1 - BLK (S3)	TB1 - 2
B1 - YEL (S2)	TB1 - 3
B1 - BLU (S3)	TB1 - 4
B1 - RED (P1)	TB1 - 5
B1 - YEL (P2)	TB1 - 6
B1 - BLK (P3)	TB1 - 7



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04143 DATE 10/24/60

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
30	1		1017425-5	74 45502 9005		SCREW, SET			
29	7			68 10100 2309		TERMINAL, LUG, INSULATED			
28	4		MS 35233	74 45505 4005		SCREW, MACHINE, PAN HEAD. SLOTTED.			
27	1		1019031	16 02011 0200		GEAR, BEVEL, STRAIGHT (24T/48P)			
26	1		1017405	17 02011 0180		ANGLE COUNTER, ASSY OF			
25	4			74 45505 6003		SCREW, CAP, SOCKET, HD			
24	1			73 00230 5010		PIN, PLAIN, TAPER			
23	6			61 30106 0628		SCREW, FLAT FIL HD.			
22	6			74 46805 1003		WASHER, FLAT			
21	6			74 43905 0003		WASHER, LOCK, SPLIT, HELICAL			
20	3		1019075	16 02011 0640		POST			
19	3			61 30106 0220		SCREW, FLAT FIL. HD			
18	7			74 43905 0001		WASHER, LOCK, SPLIT, HELICAL			
17	3			73 00033 0013		CLAMP, BLOCK			
16	1		1019068	16 02011 0530		GEAR, SPUR, SPLIT HUB			
15	1		1019035	16 02011 0240		CLAMP, COLLAR			
14	1		PENDING			RESOLVER			
13	1		1019715	17020110370		CLUSTER ASSY, GEAR (S II)			
12	1		1019704	17020110260		CLUSTER ASSY, GEAR (S III)			
11	1		1019710	17020110320		CLUSTER ASSY, GEAR (S IV)			
10	1		1019714	17020110360		CLUSTER ASSY, GEAR (S V)			
9	1		1019709	17020110310		CLUSTER ASSY, GEAR (S VI)			
8	1		1019708	17020110300		CLUSTER ASSY, GEAR (S VII)			
7	1		1019706	17020110280		CLUSTER ASSY, GEAR (S VIII)			
6	1		PENDING			STRIP, MARKER			
5	1			68 10200 2406		TERMINAL BOARD (BARRIER TYPE)			
4	1		1019074	16 02011 0630		POST			
3	14		PENDING	30 24660 0080		BEARING, BALL, ANNULAR, FLANGED. (D.S.)			
2	1		1019022	16 02011 0110		PLATE, GEAR (LOWER)			
1	1		1019021	16 02011 0100		PLATE, GEAR (UPPER)			

LIST OF PARTS AND MATERIALS

1019716	1016949
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 02011 0380

DRAWN M. GARNELL DATE 10-4-63
CHECKED 10-21-63
APPROVAL 10-21-63
APPROVAL
NASA APPROVAL 10-23-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDICATOR, ANGLE

CODE IDENT NO.
SIZE E
NASA NUMBER 1019716
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

MASTER

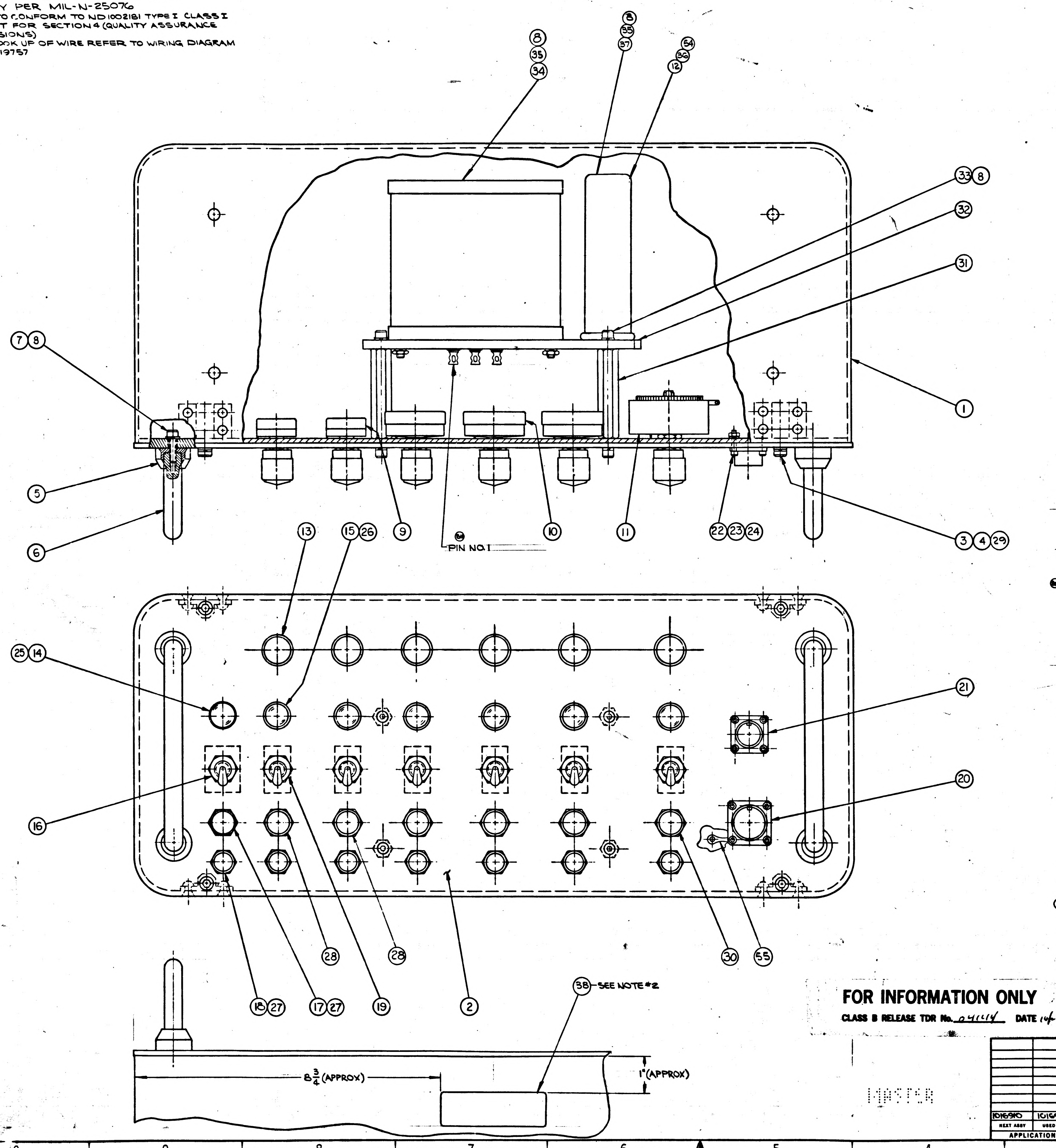
INCHES
PHOTOGRAPHIC SCALE ONLY

1019717 B

NOTES:
1- INTERPRET DWG PER MIL-D-70327
2- APPLY PER MIL-N-25076
3- WIRE TO CONFORM TO ND1002181 TYPE I CLASS I
(B1) EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)
4- FOR HOOK UP OF WIRE REFER TO WIRING DIAGRAM
(B2) DWG# 1019757

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B-3 C-3	1, ITEM 13 WAS MS91528-2F2B 2, ITEM 26 WAS 68257002204	11/22/63	ECP# 99191
B	H-10 D-3 C-3 B-3 D-3 E-7	1)-ADDED NOTE #3 2)-ADDED NOTE #4 3)-ADDED ITEMS 39 THRU 55 4)-ADDED NASA NO ITEM 26 5)-ADDED GOVERN NO ITEM 21 6)-ADDED GOVERN NO ITEM 20 7)-ADDED PART NO'S TO ITEM'S NO 9, 10, & 11, 15, 17, 18 8)-ITEM #37 BRACKET, INVERTED 1001664 WAS BRACKET, SPADE LUG 9)-ITEM #27 ADDED MS90078-26 8 REQD WAS 2 REQD 10)-DELETED ITEM #29, 4 REQD MS90079-20 FUSE (3AG-1 AMP) ADDED ITEM #29, 4 REQD. AN 960-C416, WASHER FLAT 11)-ADDED CALLOUT 12) WAS MS 91528-2F2B		ECP# 105184

TDR 037664



FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 041114 DATE 10-4-6

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
55	1		1010638-4			TERMINAL, LUG, SOLDER, ANGLE			
54	2		MS35234-65	74455055065		SCREW, MACH. PAN HD, SLOTTED (10-32 x 3/8 LG)			
53	AR			60035037002		TAPE, LACING (SEE NOTE 4)			
52	56		1010490-108			INSULATION, SLEEVING (1/2" LG)			
51	AR		SEE NOTE 3			WIRE, ELECTRICAL (WHT)(AWG 14)			
50						(BLK)(AWG 14)			
49						(GY)(AWG 16)			
48						(BLK)(AWG 16)			
47						(GY)(AWG 20)			
46						(VIO)(AWG 20)			
45						(BLU)(AWG 20)			
44						(GRN)(AWG 20)			
43						(YEL)(AWG 20)			
42						(ORN)(AWG 20)			
41						(RED)(AWG 20)			
40						(BRN)(AWG 20)			
39	AR		SEE NOTE 3			WIRE ELECTRICAL (BLK)(AWG 20) SEE NOTE 4)			
38	1		1019094	03386900628		PLATE, NAME, CONTROL BOX			
37	1		1001664	03386900839		BRACKET, INVERTED			
36	1		1017478	03386900627		SAFETY BOOT			
35	6		MS35650-104	61501052010		NUT, HEX (#10)			
34	1		1017475	03386900625		TRANSFORMER			
33	12		1017479-24	74455059010		SCREW-CAP SOC HD (10-32 x 1/2 LG)			
32	1		1019077	03386900612		PLATE, MTG			
31	4		1019076	03386900608		STAND-OFF			
30	2		MS90079-23	68151000933		FUSE (3AG-8 AMP)			
29	4		AN960-C416	74468051006		WASHER, FLAT, REGULAR (1/4)			
28	4		MS90079-18	68151000917		FUSE (3AG-.5 AMP)			
27	8		MS90078-26			FUSE (3AG-2 AMP)			
26	6		1017511-1	68257000701		LAMP			
25	1		1017463	68257001901		LAMP GLOW			
24	8		MS35649-45	74443090004		NUT, HEX (#4)			
23	8		MS35338-78	74439003002		WASHER, LOCK			
22	8		1017418-11	74455058011		SCREW, CAP SOC HD			
21	1		MS3122E-12-10S			CONNECTOR			
20	1		MS3122E-16-8P			CONNECTOR			
19	6		MS25306-22			SWITCH			
18	7		1001668-2	68152000702		FUSE HOLDER			
17	7		1001667-6	68152001406		FUSE HOLDER			
16	1		MS25307-22			SWITCH			
15	6		1001669-1	68251002201		LAMP HOLDER			
14	1		1017465	68251002105		LAMP HOLDER (POWER)			
13	6		MS91528-2N2B			KNOB, CONTROL			
12	1		1017477	03386900626		CAPACITOR			
11	1		1017500	03386900700		POWER RHEOSTAT			
10	3		1016003-10			POTENTIOMETER			
9	2		1017498	[illegible]		POTENTIOMETER			
8	14		MS35338-81	74439008005		WASHER LOCK			
7	4		1017479-26	74455059012		SCREW CAP SOC HD			
6	2		1016970	03386900042		HANDLE			
5	4		1016965	03386900041		FERRULE			
4	4		MS35338-82	74439003006		WASHER LOCK			
3	4		1019081	03386900609		SCREW CAPTIVE			
2	1		1019082	03386900603		PANEL, CONTROL BOX			
1	1		1019725	02386900108		COVER ASSY CONTROL BOX			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900075
DRAWN Andolfo DATE 7-20-63
CHECKED E. P. Merrill 9/20/63
APPROVAL
APPROVAL 9-23-63
NASA APPROVAL 10-2-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
ASSY

CODE IDENT NO. | SIZE E | NASA NUMBER 1019717
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

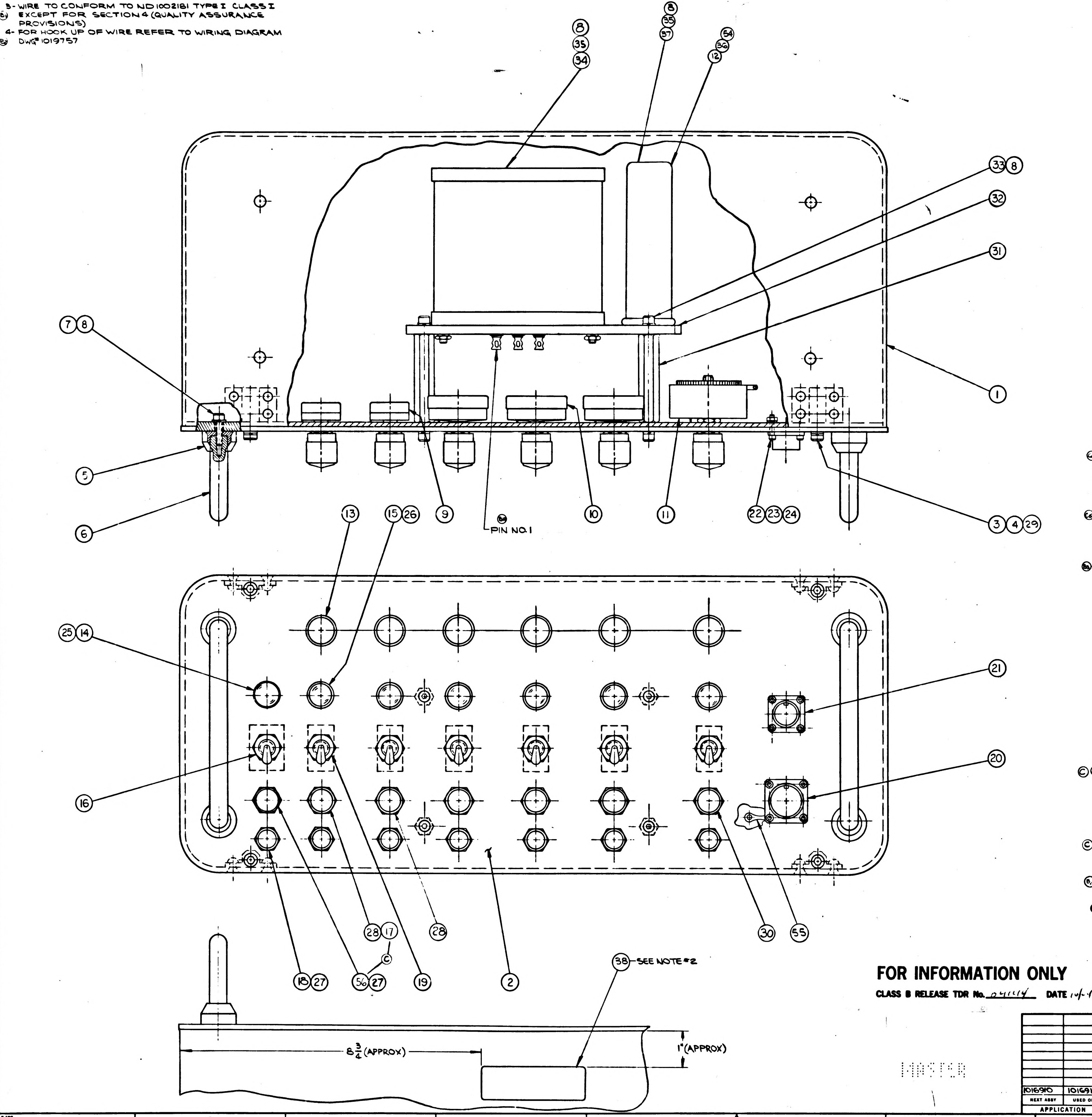
1019717

1019717	C

NOTES:

1- INTERPRET DWG PER MIL-D-70327
2- APPLY PER MIL-P-19834 Ⓔ1
3- WIRE TO CONFORM TO ND1002181 TYPE I CLASS I EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS) Ⓑ1
4- FOR HOOK UP OF WIRE REFER TO WIRING DIAGRAM DWG# 1019757 Ⓑ2

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B-3 C-3	1, ITEM 13 WAS MS91528-2F2B 2, ITEM 26 WAS 6825700220	11/22/63	ECP# 77191
B	H-10 D-3 C-3 B-3 D-3 E-7	1)-ADDED NOTE #3 2)-ADDED NOTE #4 3)-ADDED ITEMS 39 THRU 55 4)-ADDED NASA NO ITEM 26 5)-ADDED GOVERN. NO ITEM 21 6)-ADDED GOVERN NO ITEM 20 7)-ADDED PART NO'S TO ITEM'S NO 9, 10, & 11, 15, 17, 18 8)-ITEM #37 BRACKET, INVERTED 1001664 WAS BRACKET, SPADE LUG 9)-ITEM #27 ADDED MS90078-26 8 REQD WAS 2 REQD 10)-DELETED ITEM #29, 6 REQD MS90079-20 FUSE (3AG-1 AMP) ADDED ITEM #29, 4 REQD, AN960-C416, WASHER, FLAT 11): ADDED CALLOUT WAS MS91528-2078 TORR U7664	4/ /64	ECP# 106184
C		REVISED PER ECP NO. 106219 TORR 11004 DATE 7-21-64	5-21-64	



FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 041114 DATE 10-1-1/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
56	1		1001667-2	6815200 1402		FUSEHOLDER			
55	1		1010638-4			TERMINAL, LUG, SOLDER, ANGLE			
54	2		MS35234-65	74455055065		SCREW, MACH. PAN HD. SLOTTED (10-32 × 3/8 LG)			
53	AR		1001670-2	60035037002		TAPE, LACING (SEE NOTE 4)			
52	56		1010490-108			INSULATION, SLEEVING (1/2" LG)			
51	AR		SEE NOTE 3			WIRE, ELECTRICAL (WHT)(AWG 14)			
50						(BLK)(AWG 14)			
49						(GY)(AWG 16)			
48						(BLK)(AWG 16)			
47						(GY)(AWG 20)			
46						(VIO)(AWG 20)			
45						(BLU)(AWG 20)			
44						(GRN)(AWG 20)			
43						(YEL)(AWG 20)			
42						(ORN)(AWG 20)			
41						(RED)(AWG 20)			
40						(BRN)(AWG 20)			
39	AR		SEE NOTE 3			WIRE ELECTRICAL (BLK)(AWG 20) SEE NOTE 4)			
38	1		1019094	03386900628		PLATE, NAME, CONTROL BOX			
37	1		1001664	03386900839		BRACKET, INVERTED			
36	1		1017478	03386900627		SAFETY BOOT			
35	6		MS35650-104	61501052010		NUT, HEX (#10)			
34	1		1017475	[illegible]		TRANSFORMER			
33	12		1017479-24	74455059010		SCREW-CAP SOC HD (10-32 × 1/2 LG)			
32	1		1019077	03386900612		PLATE, MTG			
31	4		1019076	03386900608		STAND-OFF			
30	2		MS90079-23	68151000933		FUSE (3AG-8 AMP)			
29	4		AN960-C416	74468051006		WASHER, FLAT, REGULAR (1/4)			
28	4		MS90079-18	68151000917		FUSE (3AG-.5 AMP)			
27	8		MS90078-26			FUSE (3AG-2 AMP)			
26	6		1001659-1	6825700070		LAMP, MINIATURE			
25	1		1017483	6825700 1901		LAMP GLOW			
24	8		MS35649-45	7444 3090004		NUT, HEX (#4)			
23	8		MS35338-78	7443900 3002		WASHER, LOCK			
22	8		1017418-11	74455058011		SCREW, CAP SOC HD			
21	1		MS3122E-12-10S			CONNECTOR			
20	1		MS3122E-16-8P			CONNECTOR			
19	6		MS25306-22			SWITCH			
18	7		1001668-2	6815200 0702		FUSE HOLDER			
17	6		1001667-6	6815200 1406		FUSE HOLDER			
16	1		MS25307-22			SWITCH			
15	6		1001229-1	68251002201		LAMP HOLDER			
14	1		1017435	68251002105		LAMP HOLDER (POWER)			
13	6		MS91528-2N2B			KNOB, CONTROL			
12	1		1017477	03386900626		CAPACITOR			
11	1		1017500	03386900700		POWER RHEOSTAT			
10	3		1016003-10			POTENTIOMETER			
9	2		1017498	03386900668		POTENTIOMETER			
8	14		MS35338-81	74439003005		WASHER LOCK			
7	4		1017479-26	74455059012		SCREW CAP SOC HD			
6	2		1016970	03386900042		HANDLE			
5	4		1016965	03386900041		FERRULE			
4	4		MS35338-82	74439003006		WASHER LOCK			
3	4		1019031	03386900609		SCREW CAPTIVE			
2	1		1019082	03386900605		PANEL, CONTROL BOX			
1	1		1019725	02386900108		COVER ASSY CONTROL BOX			

LIST OF PARTS AND MATERIALS

1016910	1016910
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900075
DRAWN Andolfi DATE 1-20-63
CHECKED E. P. Merrill 9/20/63
APPROVAL
APPROVAL 9-23-63
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
ASSY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

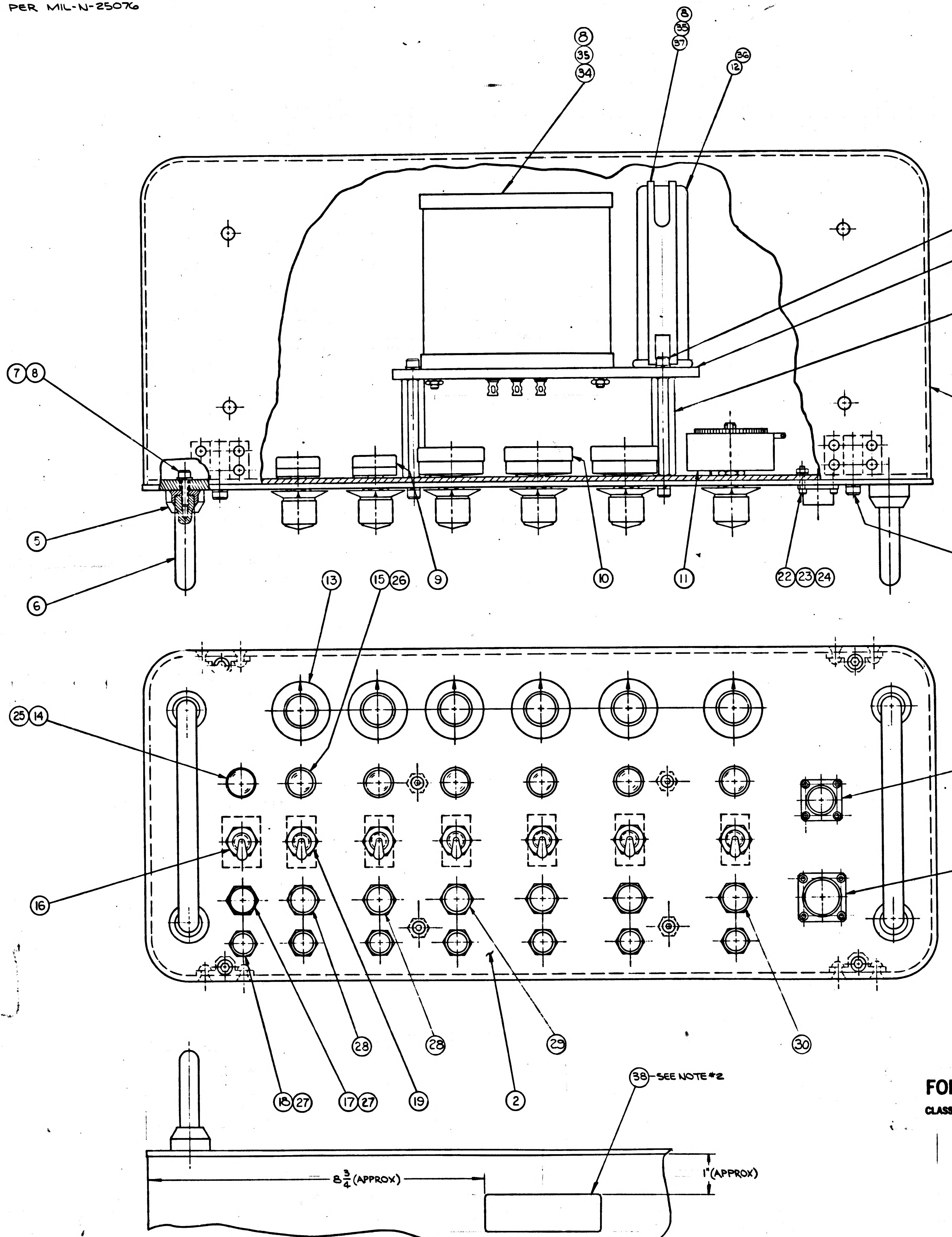
1019717

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-APPLY PER MIL-N-25076

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

1019717



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
38	1		1019094	03386900628		PLATE, NAME, CONTROL BOX			
37	2					BRACKET, SPADE LUG			
36	1		1017478	03386900627		SAFETY BOOT			
35	6		MS35650-104	61501052010		NUT, HEX (#10)			
34	1		1017475	03386900625		TRANSFORMER			
33	12		1017479-24	7445505 9010		SCREW-CAP SOC HD 10-32 x 1/2 LG			
32	1		1019077	03386900612		PLATE, MTG			
31	4		1019076	03386900608		STAND-OFF			
30	2		MS90079-23	68161000933		FUSE (3AG-8 AMP)			
29	6		MS90079-20	68151000921		FUSE (3AG-1 AMP)			
28	4		MS90079-18	68151000917		FUSE (3AG-.5AMP)			
27	2					FUSE (3AG 2AMP)			
26	6			68257002204		LAMP GLOW			
25	1		1017463	68257001901		LAMP GLOW			
24	8		MS35649-45	74443090004		NUT, HEX (#4)			
23	8		MS35338-78	74439003002		WASHER, LOCK			
22	8		1017418-11	74455058011		SCREW, CAP SOC HD			
21	1		MS3122E-12-10S			CONNECTOR			
20	1		MS3122-16-8P			CONNECTOR			
19	6		MS25306-22			SWITCH			
18	7			68152000702		FUSE HOLDER			
17	7			68152001406		FUSE HOLDER			
16	1		MS25307-22			SWITCH			
15	6			68251002201		LAMP HOLDER			
14	1			68251002105		LAMP HOLDER (POWER)			
13	6		MS91528-2F2B			KNOB, CONTROL			
12	1		1017477	03386900626		CAPACITOR			
11	1			PENDING		POWER RHEOSTAT (CLAROSTAT # 50-2)			
10	3			PENDING		POTENTIOMETER (CLAROSTAT #58C1-20)			
9	2			PENDING		POTENTIOMETER (CLAROSTAT #43C1-75)			
8	14		MS35338-81	74439003005		WASHER LOCK			
7	4		1017479-26	74455059012		SCREW CAP SOC HD			
6	2		1016970	03386900042		HANDLE			
5	4		1016965	03386900041		FERRULE			
4	4		MS35338-82	74439003006		WASHER LOCK			
3	4		1019081	03386900609		SCREW CAPTIVE			
2	1		1019082	03386900605		PANEL, CONTROL BOX			
1	1		1019725	02386900108		COVER ASSY CONTROL BOX			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 041614 DATE 10/24/63

MASTER

1016910	1016910
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0238E900075

DRAWN Andolfi DATE 1-20-63
CHECKED E.P. Newill 9/20/63
APPROVAL
APPROVAL 5-23-63
NASA APPROVAL 10/24/63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
ASSY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

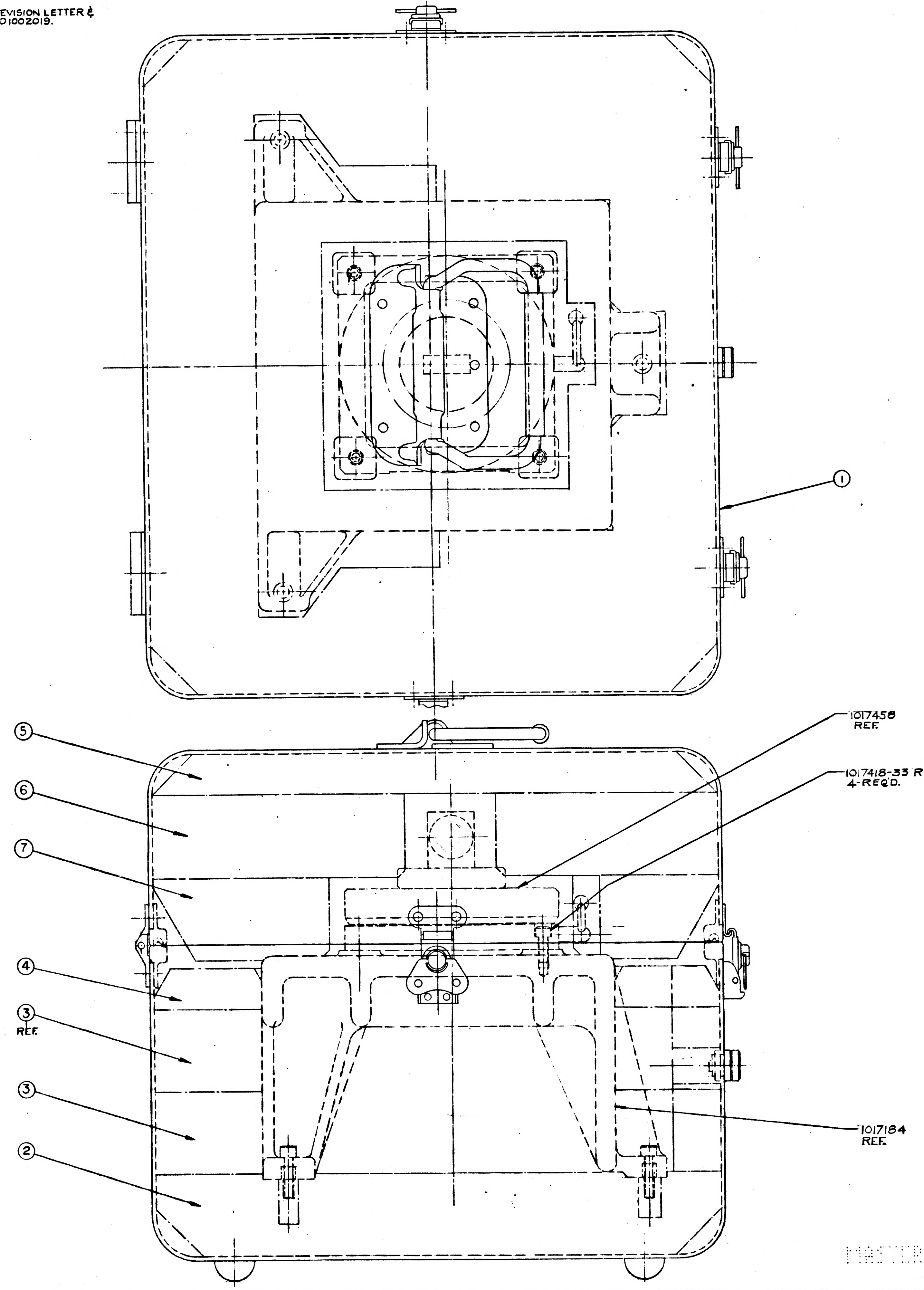
1019717

1019718

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES :-
1- INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2- CEMENT PARTS 2, 3 & 4 TOGETHER IN BOTTOM HALF OF CASE AND PARTS 7, 8 & 9 TOGETHER IN TOP HALF OF CASE WITH EC-1357 PER MIL-A-1154
3- IDENTIFY USING NASA DWG. NO. REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04721 DATE 11/19/63

ITEM NO.	QTY REQ'D	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1		1019112	03386900649		CUSHION, UPPER			
6	1		1019111	03386900648		CUSHION, UPPER			
5	1		1019110	03386900647		CUSHION, UPPER			
4	1		1019114	03386900651		CUSHION, LOWER			
3	2		1019113	03386900650		CUSHION, LOWER			
2	1		1019088	03386900646		CUSHION, LOWER			
1	1		1017487	03386900645		CASE, STORAGE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 023386900126
DRAWN DATE
CHECKED 10-25-63
APPROVAL
APPROVAL 10-25-63
NASA APPROVAL 11-18-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE STORAGE ASSEM.
POLYGON & POLYGON MOUNT

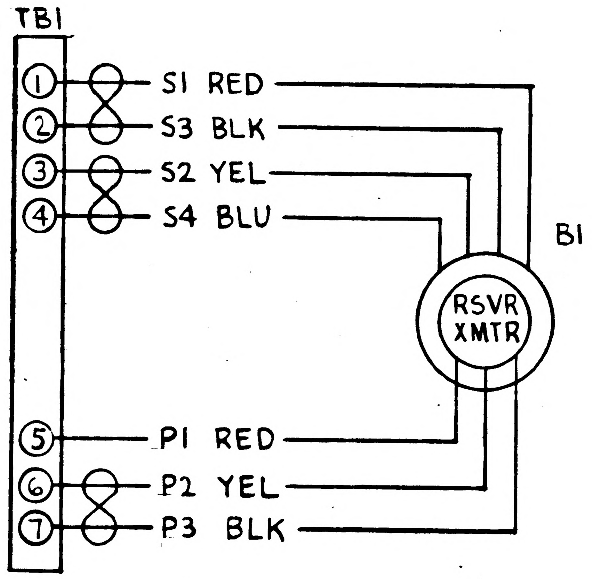
CODE IDENT NO.
SIZE E
NASA NUMBER 1019718
SCALE FULL
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

1019719 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 104901 TDRR 12000 DATE 8/25/64	12/20/63 J.M.	8/7



REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
B1			1010428		RESOLVER, XMTR			
TB1			1017485-6	68102002406	TERMINAL BOARD			

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04143 DATE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019716	1016949
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110390
DRAWN J. MARGIOTTA DATE 9-4-63
CHECKED 10-3-63
APPROVAL 10-3-63
APPROVAL 10-14-63
NASA APPROVAL 10/24/63
MIT APPROVAL 10-22-63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

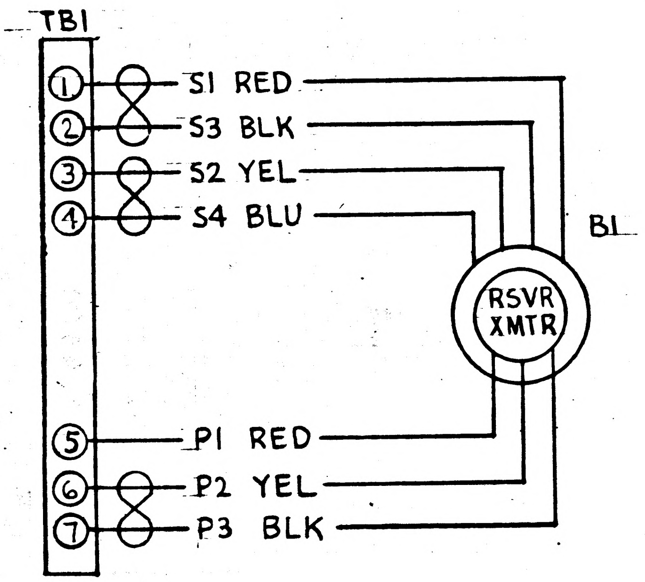
TITLE
INDICATOR, ANGLE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE C
NASA NUMBER 1019719
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY



REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
B1			PENDING		RESOLVER, XMTR			
TB1			PENDING	68102002406	TERMINAL BOARD			

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04143 **DATE** 11/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019716	1016949
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110390
DRAWN J. MARGIOTTA DATE 9-4-63
CHECKED 10-3-63
APPROVAL 10-3-63
APPROVAL 10-14-63
NASA APPROVAL 10/24/63
MIT APPROVAL 10-22-63 24 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDICATOR, ANGLE
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE C
NASA NUMBER 1019719
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

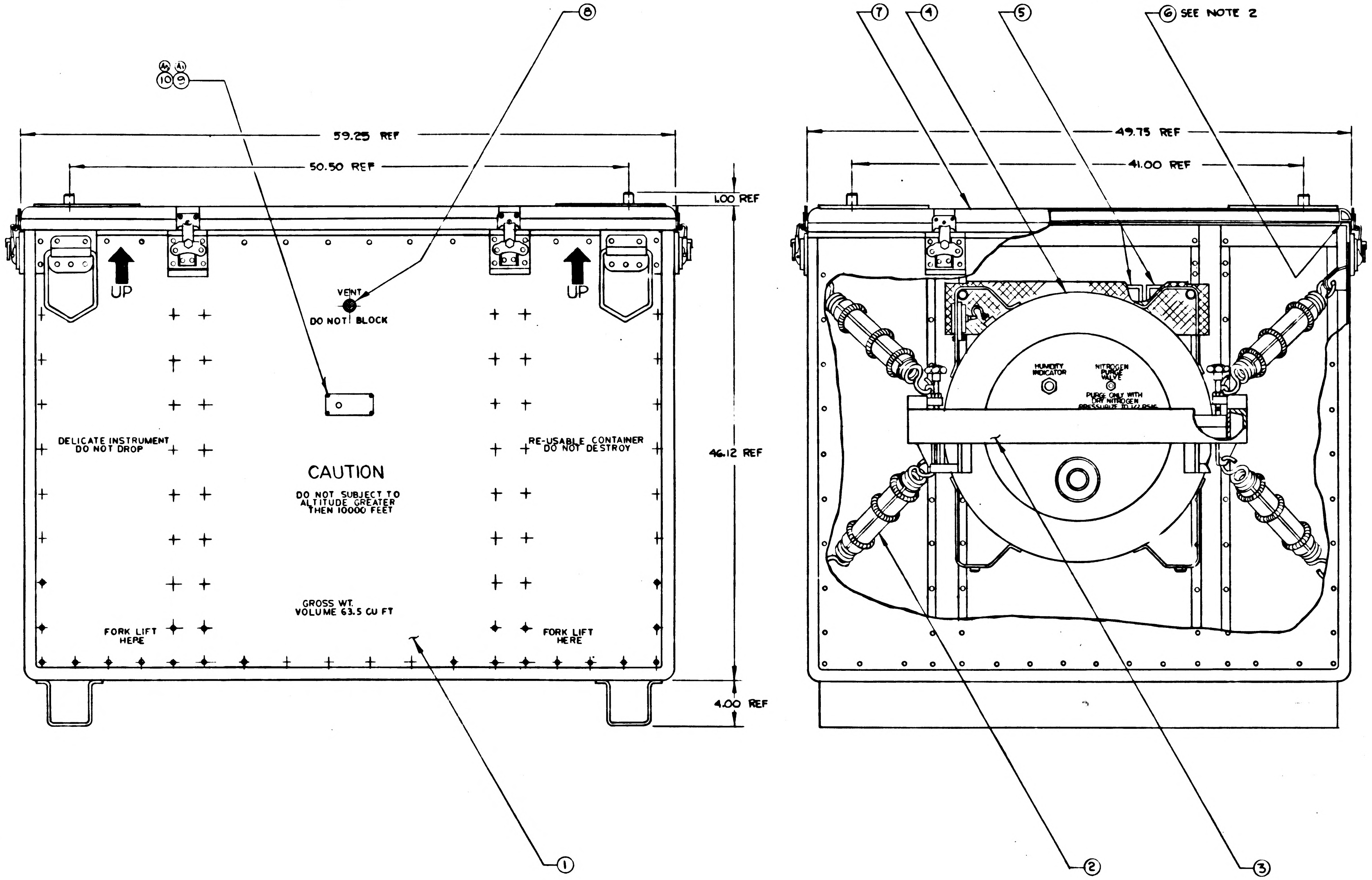
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019720 A

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. ITEM NO. ⑥ SHALL BE PERMANENTLY FASTENED TO ITEM NO. ⑦ USING EITHER AN APPROVED BONDING AGENT OR BY MECHANICAL MEANS
3. IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E-9 3-B 3-B 3-B E-9 A-2	A1) ADDED ITEM #9-7445507500I A2) " 1019681-16020180230 A3) " 1001690-16020180260 A4) WAS QTY(4) 1019671-17020180040 A5) ADDED ITEM # 10 A6) CHANGE TITLE TDRR #279 DATE 8/4/64	7-2-64 B.R.	ECO # 10686S


⑧
A5 A1
⑩ ⑨
59.25 REF
50.50 REF
1.00 REF
46.12 REF
4.00 REF
UP
UP
VENT
DO NOT BLOCK
DELICATE INSTRUMENT
DO NOT DROP
RE-USABLE CONTAINER
DO NOT DESTROY
CAUTION
DO NOT SUBJECT TO
ALTITUDE GREATER
THEN 10000 FEET
GROSS WT.
VOLUME 63.5 CU FT
FORK LIFT
HERE
FORK LIFT
HERE
①
⑦
④
⑤
⑥ SEE NOTE 2
49.75 REF
41.00 REF
HUMIDITY
INDICATOR
NITROGEN
PURGE
VALVE
PURGE ONLY WITH
DRY NITROGEN
PRESSURIZE TO 1/2 PSIG
②
③

	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
A5	10	1		1019693	16020180380		PLATE, IDENTIFICATION			
A1	9	4		MS24646-1	7445507500I		SCREW, TAPPING, THREAD CUTTING			
	8	2		1019662	16020120520		VENT, SNAP			
	7	1		1019668	17020180030		COVER ASSEMBLY			
A2	6	1		1019681	16020180230		GASKET			
A3	5	48		1001690	16020180260		DESICCANT			
	4	1		1019665	17020180010		CONTAINER, ASSEMBLY, HANDLING			
	3	1		1019672	17020180050		FRAME ASSEMBLY			
A4	2	8		1001688	16020180220		ISOLATOR, SHOCK			
	1	1		1019666	17020180020		CONTAINER ASSEMBLY, SHIPPING			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 09642 DATE 28 May 64

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020180000
DRAWN R CARROLL DATE 5/22/64
CHECKED 5-25-64
APPROVAL
APPROVAL 5-26-64
NASA APPROVAL
MIT APPROVAL

A6
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICS-NAV BASE
SHIPPING CONTAINER

CODE IDENT NO
SIZE E
NASA NUMBER 1019720
SCALE 1:4
WEIGHT CALC ACTUAL
SHEET 1 OF 1

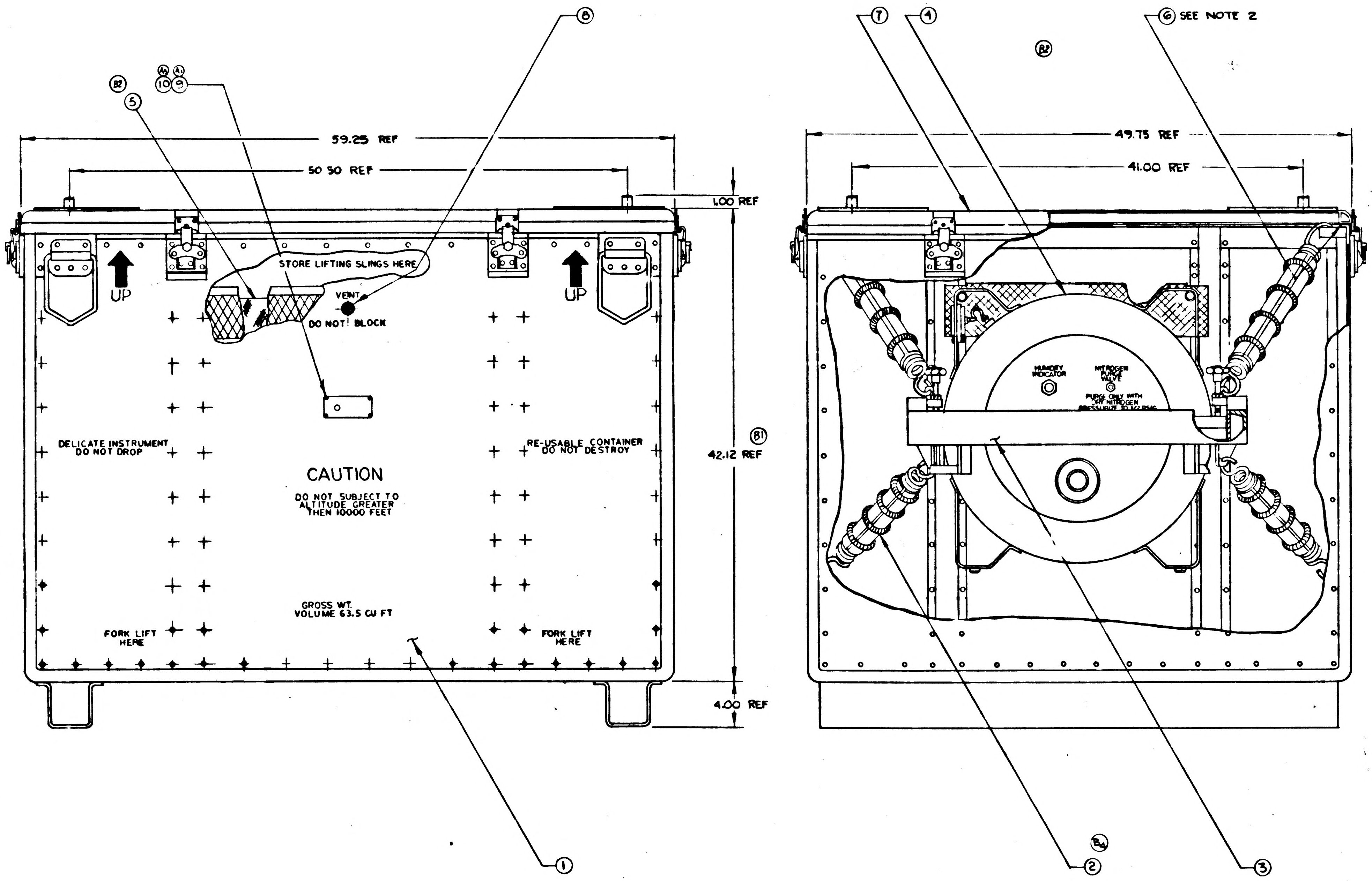
1019720 B

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. BOND ITEM NO ⑥ TO ITEM NO ⑦ USING NEOPRENE ADHESIVE PER MIL-A-1154 (B3)
3. IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E-9 3-B 3-B 3-B E-9 A-2	A1) ADDED ITEM #9-74455075001 A2) " 1019681-16020180230 A3) " 1001690-16020180490 A4) WAS QTY(4) 1019671-17020180040 A5) ADDED ITEM # 10 A6) CHANGE TITLE TDRR 11279 DATE 8/4/64	7-2-64 B.R.	03603
B4		REVISED PER ECP 106574 TDRR 15877 DATE 2-3-65	8-5-64 RC	



⑧
B2
A5 A1
10 9
⑤
59.25 REF
50.50 REF
1.00 REF
STORE LIFTING SLINGS HERE
UP
UP
VENT
DO NOT BLOCK
DELICATE INSTRUMENT DO NOT DROP
RE-USABLE CONTAINER DO NOT DESTROY
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10000 FEET
GROSS WT.
VOLUME 63.5 CU FT
FORK LIFT HERE
FORK LIFT HERE
B1
42.12 REF
4.00 REF
①
⑦
④
⑥ SEE NOTE 2
B2
49.75 REF
41.00 REF
HUMIDITY INDICATOR
NITROGEN PURGE VALVE
PURGE ONLY WITH DRY NITROGEN
B4
②
③

A5 10	1		1019693	16020180380		PLATE, IDENTIFICATION			
A1 9	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING			
8	2		1019662	16020120520		VENT, SNAP			
7	1		1019668	17020180030		COVER ASSEMBLY			
A2 6	1		1019681	16020180230		GASKET			
A3 5	2		1001699	16020180490		SLING BELT, WEB			
4	1		1019665	17020180010		CONTAINER, ASSEMBLY, HANDLING			
3	1		1019672	17020180050		FRAME ASSEMBLY			
A4 2	8		1001688	16020180220		ISOLATOR, SHOCK			
1	1		1019666	17020180020		CONTAINER ASSEMBLY, SHIPPING			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020180000
DRAWN R CARROLL DATE 5/22/64
CHECKED 5-25-64
APPROVAL
APPROVAL 5-26-64
NASA APPROVAL 5/29/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

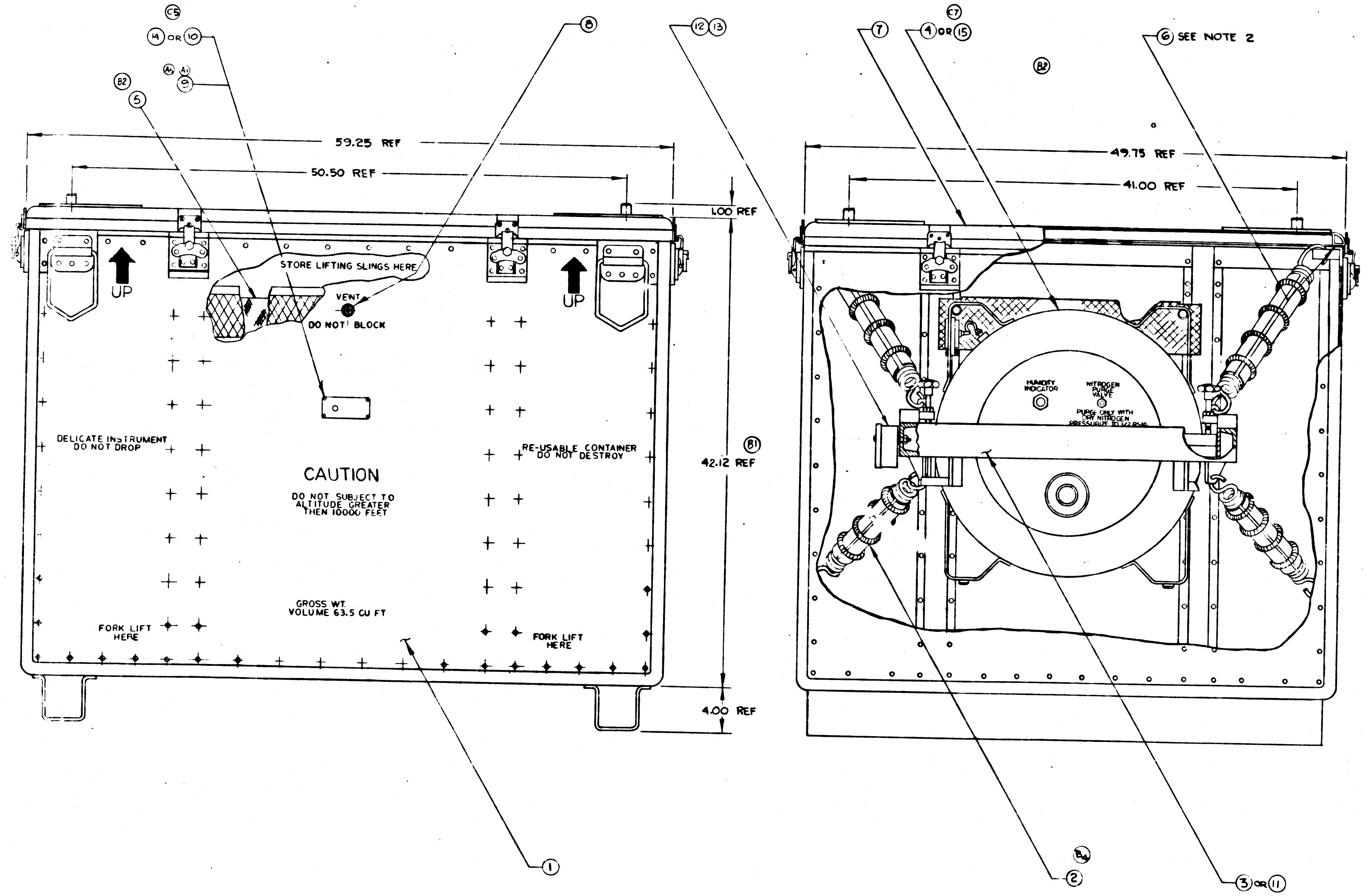
TITLE
OPTICS-NAV BASE
SHIPPING CONTAINER

CODE IDENT NO
SIZE E
NASA NUMBER 1019720
SCALE 1:4
WEIGHT CALC ACTUAL
SHEET 1 OF

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. BOND ITEM NO ⑥ TO ITEM NO ⑦ USING NEOPRENE ADHESIVE PER MIL-A-1154
3. SERIALIZE PER ND1002023 ON NAMEPLATE

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E-9 3-B 3-B 3-B E-9 A-2	A1) ADDED ITEM #9 74455075001 A2) " 10[illegible]631-160 [illegible]180230 A3) " 10[illegible]90-16 20180260 A4) WAS [illegible] 20180040 A5) ADDED ITEM # [illegible] A6) CHANGE TITLE TDRR [illegible] DATE [illegible]	7-2-64 B.R.	ECP'S 06605
B4		REVISED PER ECP 10657A TDRR 15897 DATE [illegible]	8-5-64 RC	
C7		REVISED PER ECO 116062 TDRR 25739 DATE 2/14/66	[illegible]	[illegible]



⑭ OR ⑩
⑨
⑤
⑧
⑫ ⑬
⑦
④ OR ⑮
⑥ SEE NOTE 2
C5
C7
B2
B1
B4
C2
59.25 REF
50.50 REF
1.00 REF
42.12 REF
4.00 REF
49.75 REF
41.00 REF
UP
UP
STORE LIFTING SLINGS HERE
VENT
DO NOT BLOCK
DELICATE INSTRUMENT DO NOT DROP
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10000 FEET
RE-USABLE CONTAINER DO NOT DESTROY
GROSS WT
VOLUME 63.5 CU FT
FORK LIFT HERE
FORK LIFT HERE
HUMIDITY INDICATOR
NITROGEN PURGE VALVE
PURGE ONLY WITH DRY NITROGEN PRESSURIZE TO 1/2 PSIG
①
②
③ OR ⑪

QTY REQD	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	15	–		1019665-011			CONTAINER ASSY, HANDLING			
1	14	–		1019693-001			PLATE, IDENTIFICATION			
2	13	–		1016151-006			NUT, SELF-LOCKING			
1	12	–		1897338-003			RECORDER, SHOCK			
1	11	–		1019672-011			FRAME ASSEMBLY			
–	10	1		1019693	16020180380		PLATE, IDENTIFICATION			
4	9	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING			
2	8	2		1019662	16020120520		VENT, SNAP			
1	7	1		1019668	17020180030		COVER ASSEMBLY			
1	6	1		1019[illegible]31	16020180230		GASKET			
2	5	2		1001[illegible]	16020180490		SLING BELT, WEB			
–	4	1		1019665	17020180010		CONTAINER, ASSEMBLY, HANDLING			
–	3	1		1019672	17020180050		FRAME ASSEMBLY			
8	2	8		10C1[illegible]38	16020180220		ISOLATOR, SHOCK			
1	1	1		1019666	17020180020		CONTAINER ASSEMBLY, SHIPPING			
011		000								

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± – DECIMALS ± – ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL —

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K/C PN 18020180000
DRAWN R CARROLL DATE 5/21/64
CHECKED [illegible] 5-25-64
APPROVAL
APPROVAL [illegible] 5-26-64
NASA APPROVAL [illegible]
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICS-NAV BASE SHIPPING CONTAINER

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 10[illegible]720
SCALE 1:4
WEIGHT CALC ACTUAL
SHEET 1 OF 1

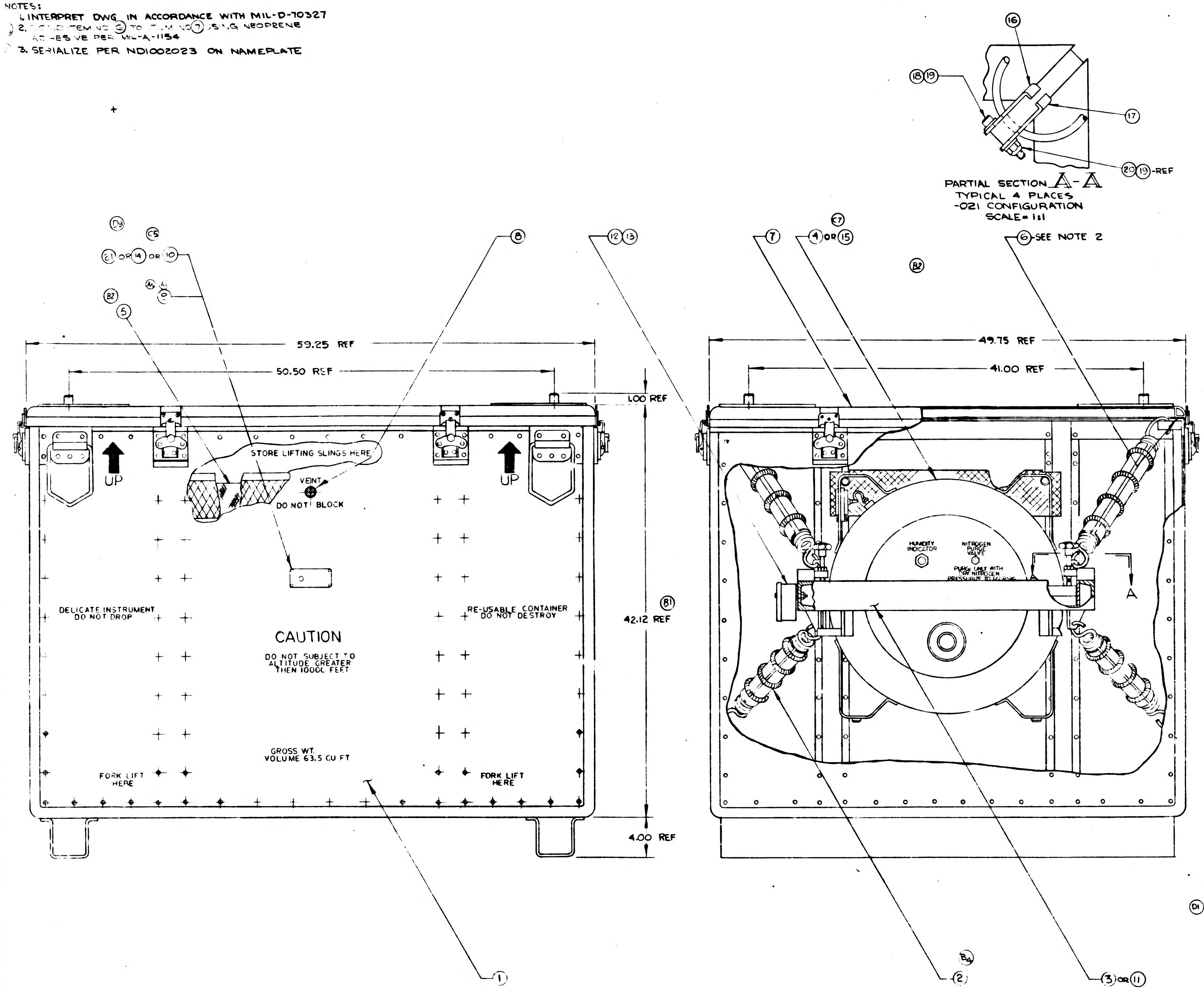
C4
NEXT ASSY	USED ON
1900030	1900030

APPLICATION

CONTRACT NAS-9-497

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. BOND ITEM NO ⑤ TO ITEM NO ⑦ USING NEOPRENE ADHESIVE PER MIL-A-1154
3. SERIALIZE PER ND1002023 ON NAMEPLATE

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E-9 3-B 3-B 3-B E-9 A-Z	A1) ADDED ITEM #9-7445507500 A2) " 1019681-16020180290 A3) " 1001690-16020180260 A4) WAS QTY(4) 1019[illegible]16020180040 A5) ADDED ITEM # [illegible] A6) CHANGE TITLE TDRR [illegible] DATE [illegible]	2-2-64 B.R.	ECP# 06605
B4		REVISED PER ECP 06574 TDRR 15997 DATE 3-3-65	8-5-64 RC	
C7		REVISED PER ECO 116062 TDRR 25739 DATE 2/14/66	2/14/66 RC	2-2-66
D3		REVISED PER ECO 115775 TDRR 63007 DATE 6/1/66	RL	



⑯
⑰
⑱⑲
⑳⑲-REF
PARTIAL SECTION A-A
TYPICAL 4 PLACES
-021 CONFIGURATION
SCALE = 1:1
⑧
⑫⑬
⑦
④ OR ⑮
⑥-SEE NOTE 2
⑳ OR ⑭ OR ⑩
⑨
⑤
59.25 REF
50.50 REF
1.00 REF
42.12 REF
4.00 REF
49.75 REF
41.00 REF
STORE LIFTING SLINGS HERE
VENT
DO NOT BLOCK
UP
UP
DELICATE INSTRUMENT DO NOT DROP
RE-USABLE CONTAINER DO NOT DESTROY
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10000 FEET
GROSS WT.
VOLUME 63.5 CU FT
FORK LIFT HERE
FORK LIFT HERE
HUMIDITY INDICATOR
NITROGEN PURGE VALVE
PURGE ONLY WITH DRY NITROGEN PRESSURE
A
A
①
②
③ OR ⑪

QTY REQD -021	QTY REQD -011	ITEM NO	QTY REQD -000	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	–	21	–		1019693-002			PLATE, IDENTIFICATION			
4	–	20	–		1016151-010			NUT, SELF LOCKING (NYLON) INSERT			
8	–	19	–		AN960C10	74468051005		WASHER, FLAT			
4	–	18	–		MS16996-15			SCREW, CAP, SOCKET HEAD			
4	–	17	–		1022654			RETAINER			
4	–	16			1022655			RETAINER			
1	1	15	–		1019665-011			CONTAINER ASSY, HANDLING			
–	1	14	–		1019693-001			PLATE, IDENTIFICATION			
2	2	13	–		1016151-006			NUT, SELF-LOCKING			
1	1	12	–		1837338-003			RECORDER, SHOCK			
1	1	11	–		1019672-011			FRAME ASSEMBLY			
–	–	10	1		1019693	16020180380		PLATE, IDENTIFICATION			
4	4	9	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING			
2	2	8	2		1019662	16020120520		VENT, SNAP			
1	1	7	1		1019668	17020180030		COVER ASSEMBLY			
1	1	6	1		1019[illegible]31	16020180230		GASKET			
2	2	5	2		[illegible]	16020180430		SLING, BELT, WEB			
–	–	4	1		1019665	17020180010		CONTAINER, ASSEMBLY, HANDLING			
–	–	3	1		1019672	17020180050		FRAME ASSEMBLY			
8	8	2	8		1001[illegible]38	16020180220		ISOLATOR, SHOCK			
1	1	1	1		1019666	17020180020		CONTAINER ASSEMBLY, SHIPPING			

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K/C PN 18020180000
DRAWN R CARROLL DATE 5/2/64
CHECKED B. [illegible] 5-25-
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICS-NAV BASE
SHIPPING CONTAINER

CODE IDENT NO 89944
SIZE E
NASA NUMBER 101972[illegible]
SCALE 1:4
WEIGHT CALC ACTUAL
SHEET 1 OF

NEXT ASSY	USED ON
1900030	1900030

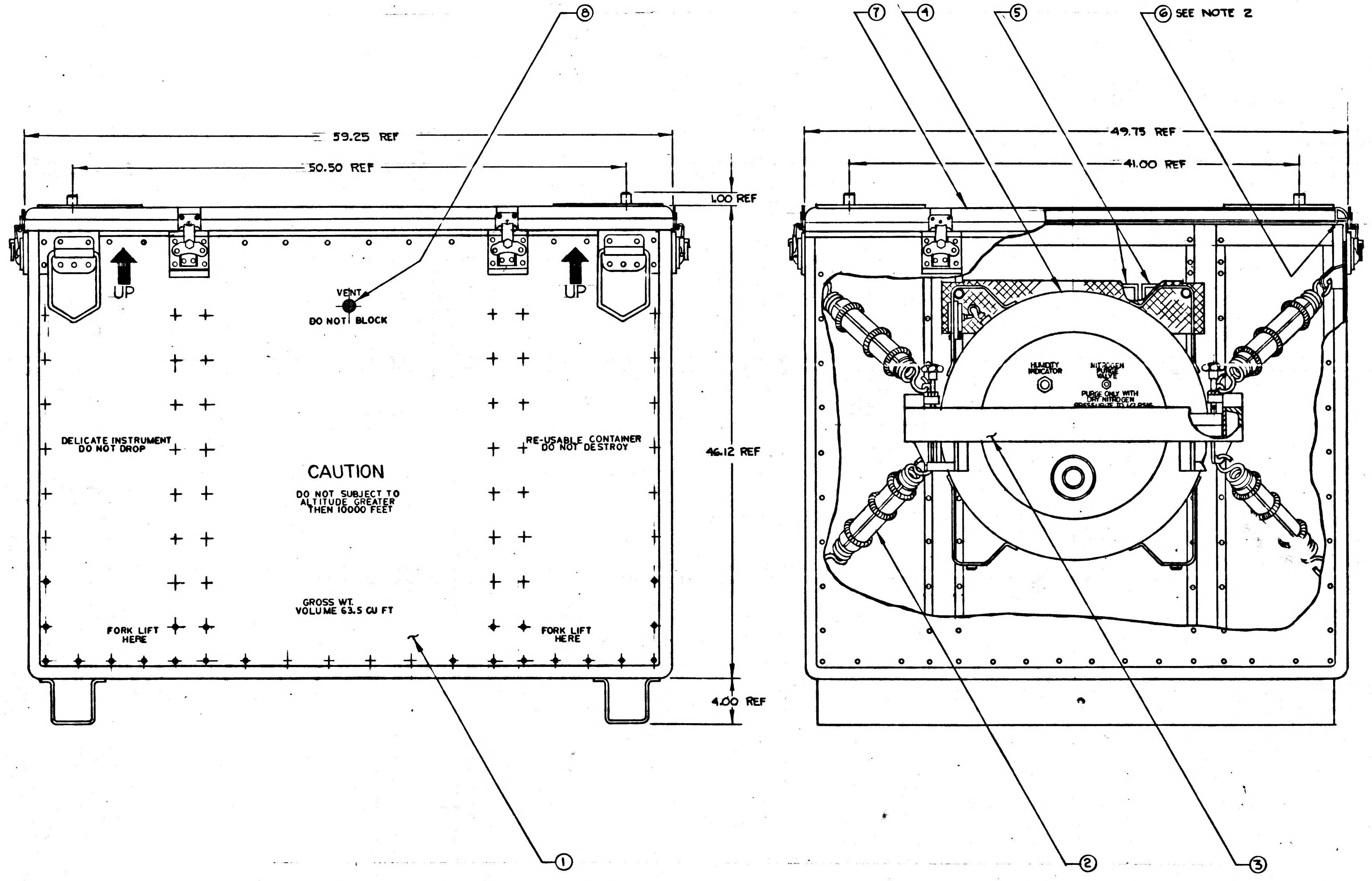
APPLICATION

CONTRACT NAS-9-497

1017384

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. ITEM NO. ⑥ SHALL BE PERMANENTLY FASTENED TO ITEM NO. ⑦ USING EITHER AN APPROVED BONDING AGENT OR BY MECHANICAL MEANS
3. IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019


⑧
59.25 REF
50.50 REF
1.00 REF
46.12 REF
4.00 REF
UP
UP
VENT
DO NOT BLOCK
DELICATE INSTRUMENT DO NOT DROP
RE-USABLE CONTAINER DO NOT DESTROY
CAUTION
DO NOT SUBJECT TO ALTITUDE GREATER THEN 10000 FEET
GROSS WT.
VOLUME 63.5 CU FT
FORK LIFT HERE
FORK LIFT HERE
①
⑦
④
⑤
⑥ SEE NOTE 2
49.75 REF
41.00 REF
HUMIDITY INDICATOR
NITROGEN PURGE VALVE
PURGE ONLY WITH DRY NITROGEN PRESSURIZE TO 1/2 PSIG
②
③

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	2		1019662	16020120520		VENT, SNAP			
7	1		1019668	17020180030		COVER ASSEMBLY			
6	1		PENDING			GASKET			
5	48		PENDING			DESICCANT			
4	1		1019665	17020180010		CONTAINER, ASSEMBLY, HANDLING			
3	1		1019672	17020180050		FRAME ASSEMBLY			
2	4		1019671	17020180040		SHOCK, ASSEMBLY			
1	1		1019666	17020180020		CONTAINER ASSEMBLY, SHIPPING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020180000
DRAWN R CARROLL DATE 5/22/64
CHECKED 5-25-64
APPROVAL
APPROVAL 5-26-64
NASA APPROVAL 5/28/64
MIT APPROVAL 28 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SHIPPING CONTAINER ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019720
SCALE 1:4
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1017384

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 09642 DATE 28 May 64

INCHES
0 1 2

Class B
TDRR
05022

PROCUREMENT SPECIFICATION
FOR
REUSABLE SHIPPING CONTAINER AND CRADLE
FOR THE NAVIGATION BASE AND OPTICS SUBSYSTEM
ASSEMBLY, P/N 1899950

FOR INFORMATION ONLY
CLASS 3 RELEASE TDR No. 05022 DATE 10Dec63

Record of Revisions

Revision Letter	TDRR No.	Pages Revised	Approvals MIT	Approvals NASA	Date

This specification consists of page i through iv and 1 to 12 inclusive.

REUSABLE SHIPPING CONTAINER AND CRADLE
FOR
THE NAVIGATION BASE AND OPTICS SUBSYSTEM ASSEMBLY,
P/N 1899950

The purpose of this document is to establish the manufacturing and test requirements for the procurement of Reusable Shipping Container and Cradle for use in transporting the Apollo Navigation Base and Optics Subsystem Assembly, P/N 1899950.

J Hazel 12/10/63
MIT/IL Date

12/10/63
NASA/MSC Date

PROCUREMENT SPECIFICATION
FOR
REUSABLE SHIPPING CONTAINER AND CRADLE
FOR
THE NAVIGATION BASE AND OPTICS SUBSYSTEM ASSEMBLY
P/N 1899950

Table of Contents

Section	Title	Page
1	SCOPE	1
2	APPLICABLE DOCUMENTS	1
3	REQUIREMENTS	2
4	QUALITY ASSURANCE PROVISIONS	9
5	PREPARATION FOR DELIVERY	11
6	NOTES	11

PROCUREMENT SPECIFICATION
FOR
REUSABLE SHIPPING CONTAINER AND CRADLE FOR
THE NAVIGATION BASE AND OPTICS SUBSYSTEM ASSEMBLY,
P/N 1899950

1. SCOPE

This specification establishes the requirements for the procurement of a reusable shipping container and cradle (handling container), and a dummy navigation base-handling fixture. The containers shall be capable of transporting and storing either the Optical Subsystem (OSS), dummy navigation base-handling fixture and navigation base mounts or the Optics-Navigation Base Assembly and mounts, with a Navigation Base-Optics Assembly Handling and Installation Fixture.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents of the issue in effect on the date of invitation for bid shall form a part of this specification.

SPECIFICATIONS

Military

MIL-F-14072	Finishes for Ground Signal Equipment
MIL-W-27076	Workmanship Standards for Ground Electronics and Associated Equipment.

NASA

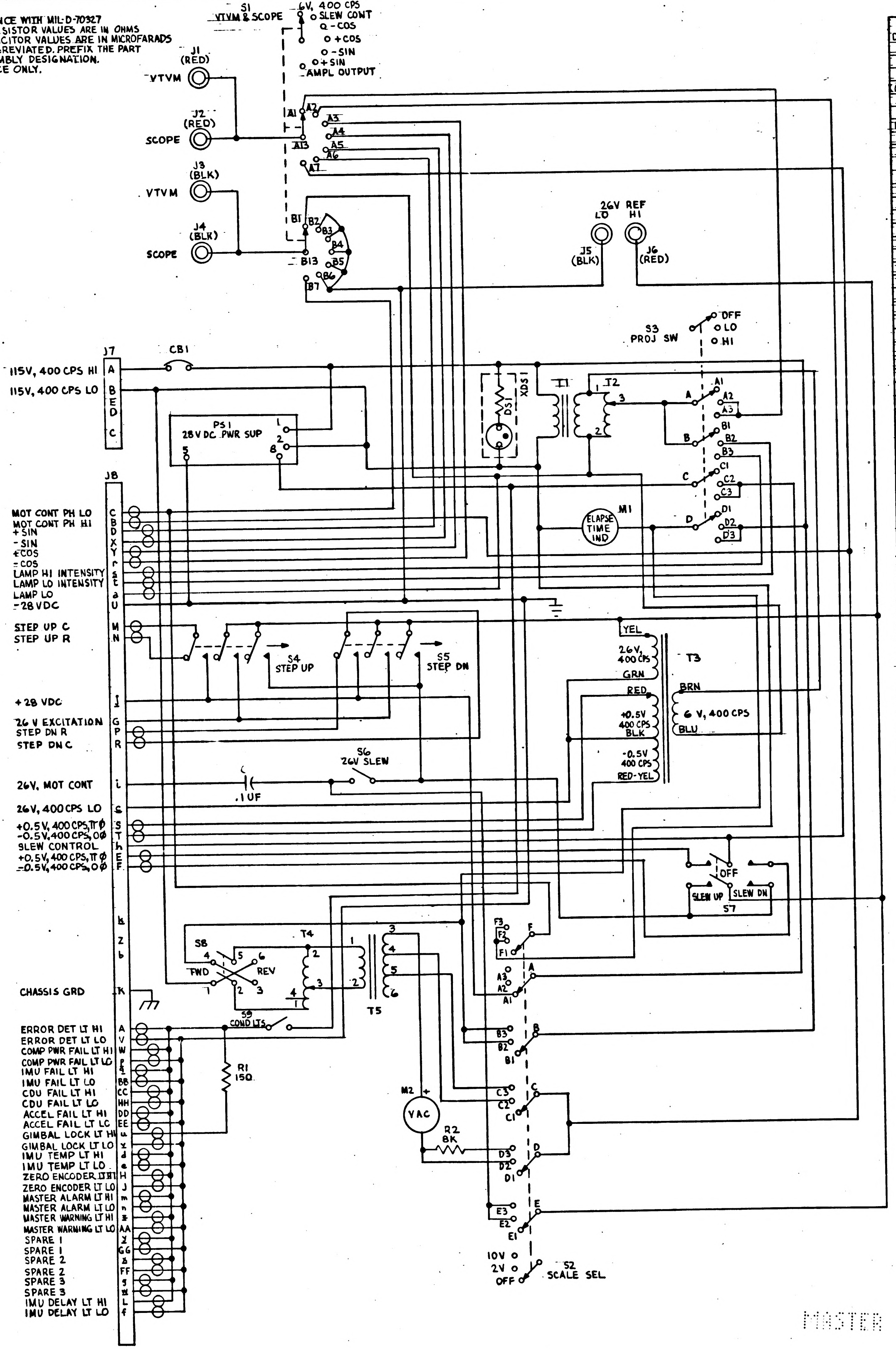
	Apollo Environmental Criteria Specification Dated March 25, 1963.

1019722

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. REFERENCE DESIGNATION ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE SUBASSEMBLY DESIGNATION.
5. PARTS LIST TO BE FOR REFERENCE ONLY.


S1
VTVM & SCOPE
6V, 400 CPS
SLEW CONT
-COS
+COS
-SIN
+SIN
AMPL OUTPUT
J1 (RED)
VTVM
J2 (RED)
SCOPE
J3 (BLK)
VTVM
J4 (BLK)
SCOPE
A1 A2 A3 A4 A5 A6 A7 A13
B1 B2 B3 B4 B5 B6 B7 B13
26V REF
LO
HI
J5 (BLK)
J6 (RED)
S3
PROJ SW
OFF
LO
HI
J7
115V, 400 CPS HI
115V, 400 CPS LO
CB1
PS1
28V DC PWR SUP
XDS1
DS1
T1
T2
J8
MOT CONT PH LO
MOT CONT PH HI
+SIN
-SIN
+COS
-COS
LAMP HI INTENSITY
LAMP LO INTENSITY
LAMP LO
-28 VDC
STEP UP C
STEP UP R
S4
STEP UP
S5
STEP DN
+28 VDC
26 V EXCITATION
STEP DN R
STEP DN C
ELAPSE TIME IND
M1
YEL
26V, 400 CPS
GRN
RED
+0.5V 400 CPS
BLK
-0.5V 400 CPS
RED-YEL
T3
BRN
6 V, 400 CPS
BLU
26V, MOT CONT
C
.1UF
S6
26V SLEW
26V, 400 CPS LO
+0.5V, 400 CPS, π ϕ
-0.5V, 400 CPS, 0 ϕ
SLEW CONTROL
+0.5V, 400 CPS, π ϕ
-0.5V, 400 CPS, 0 ϕ
OFF
SLEW UP
SLEW DN
S7
S8
FWD
REV
T4
T5
CHASSIS GRD
S9
COND LTS
ERROR DET LT HI
ERROR DET LT LO
COMP PWR FAIL LT HI
COMP PWR FAIL LT LO
IMU FAIL LT HI
IMU FAIL LT LO
CDU FAIL LT HI
CDU FAIL LT LO
ACCEL FAIL LT HI
ACCEL FAIL LT LO
GIMBAL LOCK LT HI
GIMBAL LOCK LT LO
IMU TEMP LT HI
IMU TEMP LT LO
ZERO ENCODER LT HI
ZERO ENCODER LT LO
MASTER ALARM LT HI
MASTER ALARM LT LO
MASTER WARNING LT HI
MASTER WARNING LT LO
SPARE 1
SPARE 1
SPARE 2
SPARE 2
SPARE 3
SPARE 3
IMU DELAY LT HI
IMU DELAY LT LO
R1
15Ω
M2
VAC
R2
8K
F1 F2 F3
A1 A2 A3
B1 B2 B3
C1 C2 C3
D1 D2 D3
E1 E2 E3
10V
2V
OFF
S2
SCALE SEL

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			CP12A1KC104K3	69 10030 2089	CAPACITOR	.1UF	10%	200V
CB1			PENDING		CIRCUIT BREAKER			
DS1			1017463	68 25700 1901	LAMP, NEON			
J1			PENDING	68 26600 0502	POST, BINDING (RED)			
J2			PENDING	68 26600 0502	(RED)			
J3			PENDING	68 26600 0501	(BLK)			
J4			PENDING	68 26600 0501	(BLK)			
J5			PENDING	68 26600 0501	(BLK)			
J6			PENDING	68 26600 0502	POST, BINDING (RED)			
J7			MS3102A 2222P		CONNECTOR			
J8			MS3127E 2255S		CONNECTOR			
M1			1006927		INDICATOR, TIME ELAPSE			
M2			1017460-5	68 42100 1105	VOLTMETER, MULTIRANGE			
PS1			1017457		POWER SUPPLY			
R1			RW30Y151		RESISTOR,	150		11W
R2			1017460-2	68 42100 1102	RESISTOR, FIXED	8K	1%	1W
S1			1017468-2	16 020110700-2	SWITCH, ROTARY			
S2			PENDING		, ROTARY			
S3			1017471	16 020130010	, ROTARY			
S4			PENDING		, PUSHBOTTON			
S5			PENDING		, PUSHBOTTON			
S6			PENDING		, SPST			
S7			PENDING		, DPDT			
S8			MS25307-23		, DPDT			
S9			PENDING		SWITCH, ROTARY			
T1			MS90022		TRANSFORMER			
T2			PENDING		TRANSFORMER, VAR			
T3			1011414		TRANSFORMER, PWR			
T4			1017484	68 40015 0501	TRANSFORMER, VAR			
T5			1017462	68 40018 3901	TRANSFORMER, STEPDN			
XDS1			1017465	68 25100 2105	LAMP, INDICATOR			

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04350 DATE 10/31/-

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019731	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130010
DRAWN L MARGIOTTA DATE 10-21-63
CHECKED R7/ 10-?-63
APPROVAL
APPROVAL 10-25-63
NASA APPROVAL
10-30-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, MAP
AND DATA VIEWER TESTER
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019722
SCALE NONE
WEIGHT CALC ACTUAL
SHEET OF

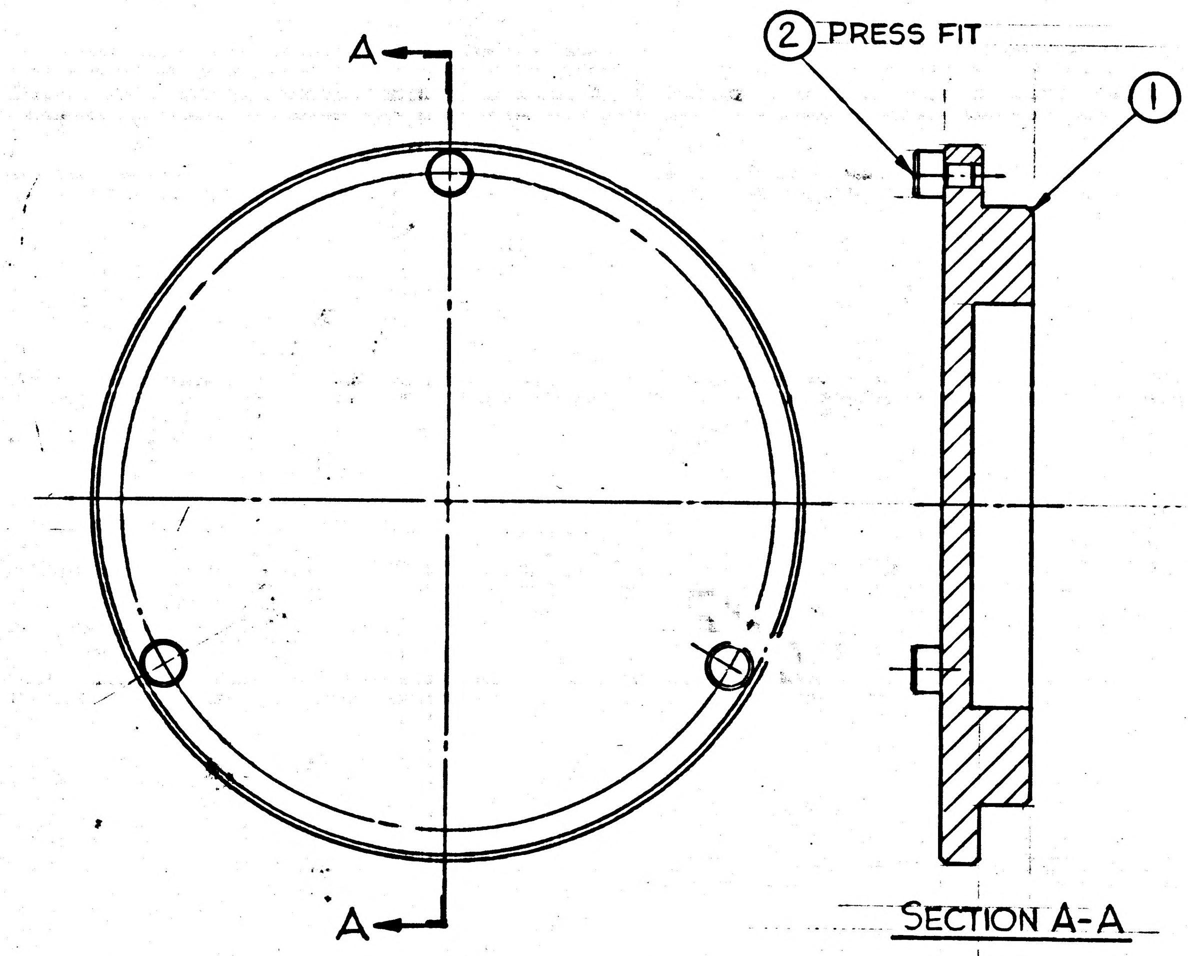
MASTER

1019722

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY USING NASA DWG NO., REV LETTER PER ND1002019



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04/141 **DATE** 10/24/63

2	3		1017473	16020100250		BUTTON, JIG			
1	1		1019093	16020100230		HOLDER, CONTAINER, OIL			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1017387	1017387
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020100030

DRAWN C. Borsody DATE 10-18-63
CHECKED J. Stampfer 10/18/63
APPROVAL
APPROVAL 10-18-63
NASA APPROVAL W. S. Dwz 10/24/63
10-24-63
MIT APPROVAL 24 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER ASSY, OIL

CODE IDENT NO.	SIZE	NASA NUMBER
	C	1019722

SCALE FULL WEIGHT CALC ACTUAL SHEET 1 OF 1

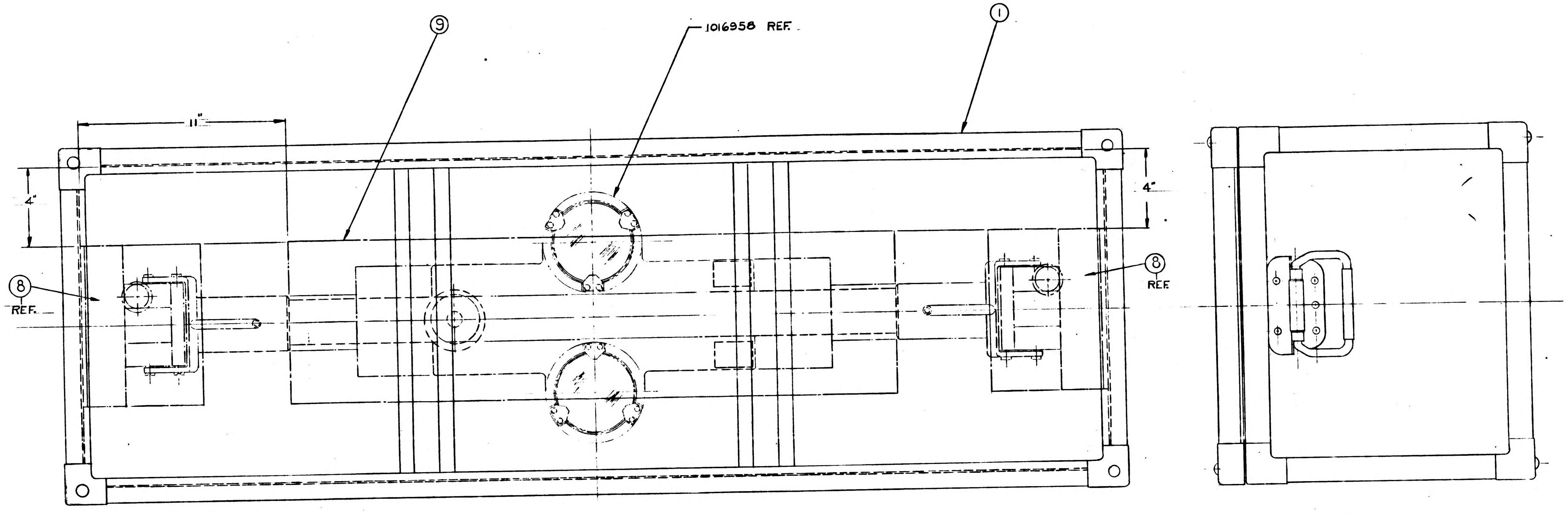
MASTER

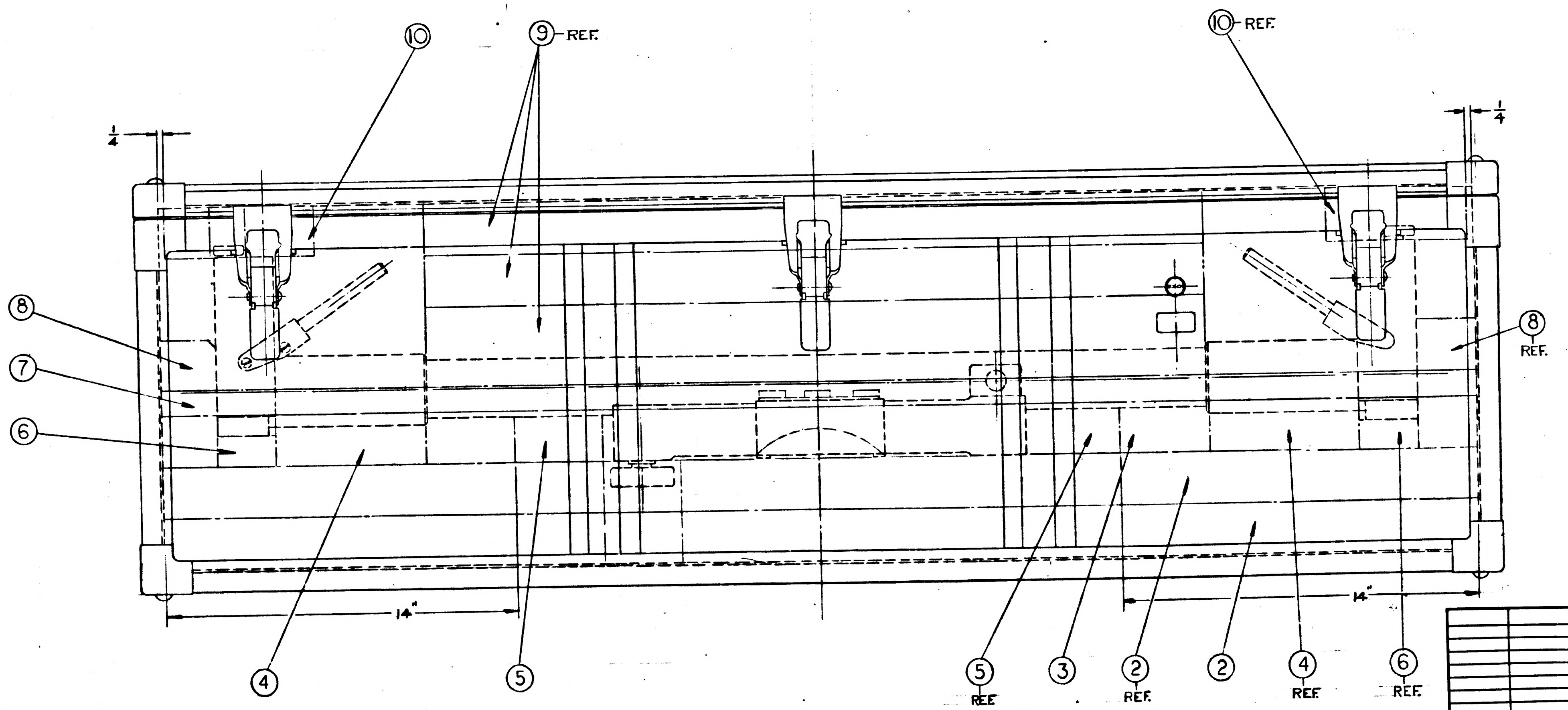
1019722

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1-INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2-CEMENTS PARTS 2 THRU 8 TOGETHER IN BOTTOM OF CASE AND PARTS 9 AND 10 TOGETHER IN TOP OF LID WITH EC-1357 PER MIL-A-1154
3-IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.





FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04721 **DATE** 11/19/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	2		1019103	03386900638		CUSHION, UPPER END			
9	3		1019104	03386900639		CUSHION, UPPER			
8	2		1019100	03386900641		CUSHION, LOWER END			
7	1		1019105-1	03386900640-1		CUSHION, LOWER			
6	2		1019102	03386900637		CUSHION, LOWER (FILLER)			
5	2		1019107	03386900642		CUSHION, LOWER			
4	2		1019108	03386900643		CUSHION, LOWER (FILLER)			
3	1		1019105-2	03386900640-2		CUSHION, LOWER			
2	2		1019109	03386900644		CUSHION, LOWER			
1	1		1017486	03386900636		CASE, STORAGE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016'0	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± 1/16 DECIMALS ± / ANGLES ± /
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900125
DRAWN B. Koslowsky DATE
CHECKED
APPROVAL
APPROVAL 10-25-63
NASA APPROVAL 11-19-63
MIT APPROVAL 11/19/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE STORAGE ASSEM.,
TRUNNION MIRROR

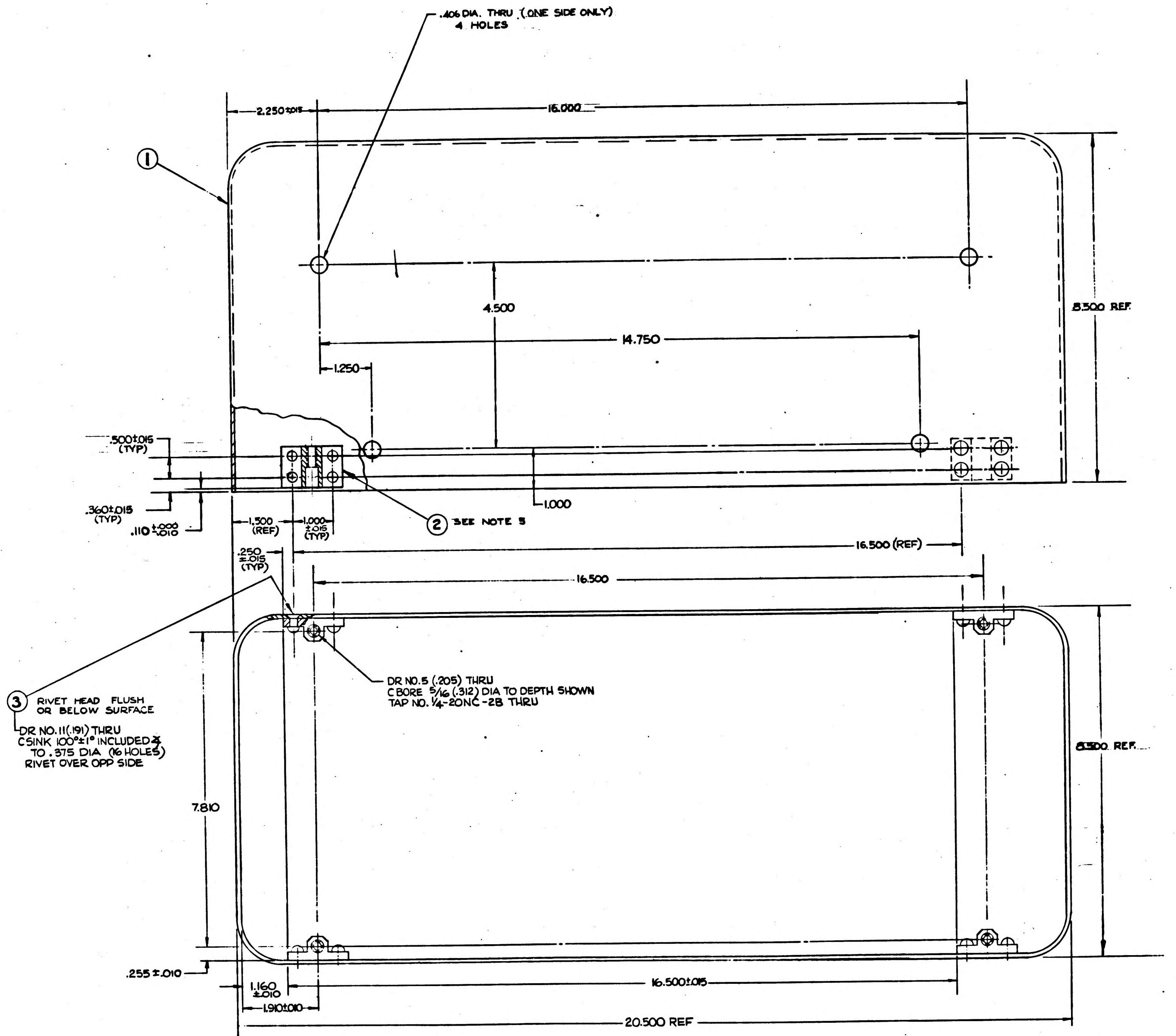
CODE IDENT NO.
SIZE E
NASA NUMBER 1019724
SCALE HALF
WEIGHT CALC ACTUAL
SHEET OF

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

1019725

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. MACHINING STANDARDS PER ND1002078
3. REMOVE BURRS IN ACCORDANCE WITH ND1002079
4. FINISH 125✓ UNLESS OTHERWISE SPECIFIED.
5. FINISH:
   - A-CHROMIC ACID ANODIZE PER MIL-A-8625 TYPE I (BEFORE ITEM ② INSTALLATION)
   - B-ASSEMBLE ITEM ②
   - C-PREPARE OUTSIDE SURFACE & EDGE PER ND 1002098
   - D-APPLY THREE COATS OF GRAY ENAMEL PER ND 1002088
6. IDENTIFY PER ND1002019, WITH NASA PART NO. REV LETTER AND MFRS SYM (KIC)



.406 DIA. THRU (ONE SIDE ONLY) 4 HOLES
2.250±.015
16.000
①
4.500
14.750
1.250
8.500 REF.
.500±.015 (TYP)
.360±.015 (TYP)
.110 +.000 -.010
1.000
② SEE NOTE 5
1.500 (REF)
1.000 ±.015 (TYP)
.250 ±.015 (TYP)
16.500 (REF)
16.500
DR NO.5 (.205) THRU
C BORE 5/16 (.312) DIA TO DEPTH SHOWN
TAP NO. 1/4-20NC-2B THRU
③ RIVET HEAD FLUSH OR BELOW SURFACE
DR NO.11 (.191) THRU
CSINK 100°±1° INCLUDED ∡
TO .375 DIA (16 HOLES)
RIVET OVER OPP SIDE
7.810
8.500 REF.
.255±.010
1.160 ±.010
1.910±.010
16.500±.015
20.500 REF

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04144 DATE 10/24/63

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	16		MS20426AD6-9	74 45400 7057		RIVET, 100° CSK			
2	4			03386900607		BLOCK, MOUNTING			
1	1			03386900606		COVER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019717	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .005 ; ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900108
DRAWN STEMPFER DATE 9-12-63
CHECKED E. R. Haswell 9/12/63
APPROVAL
APPROVAL Wilkinson 9-23-63
NASA APPROVAL W. J. Quick 10/24/63
W. H. [illegible] 10-23-63
MIT APPROVAL [illegible] 24 Oct 63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

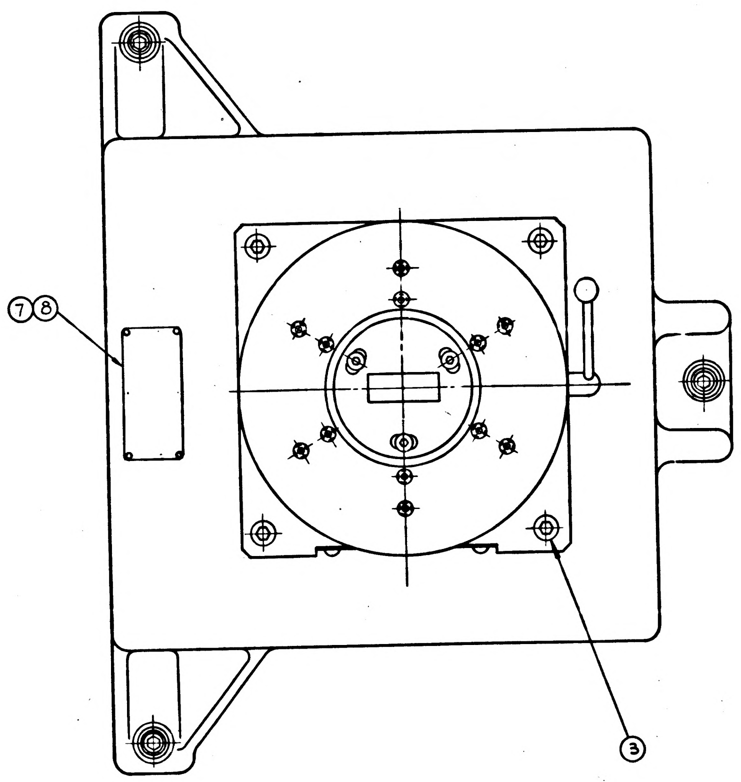
TITLE
COVER ASSEMBLY,
CONTROL BOX

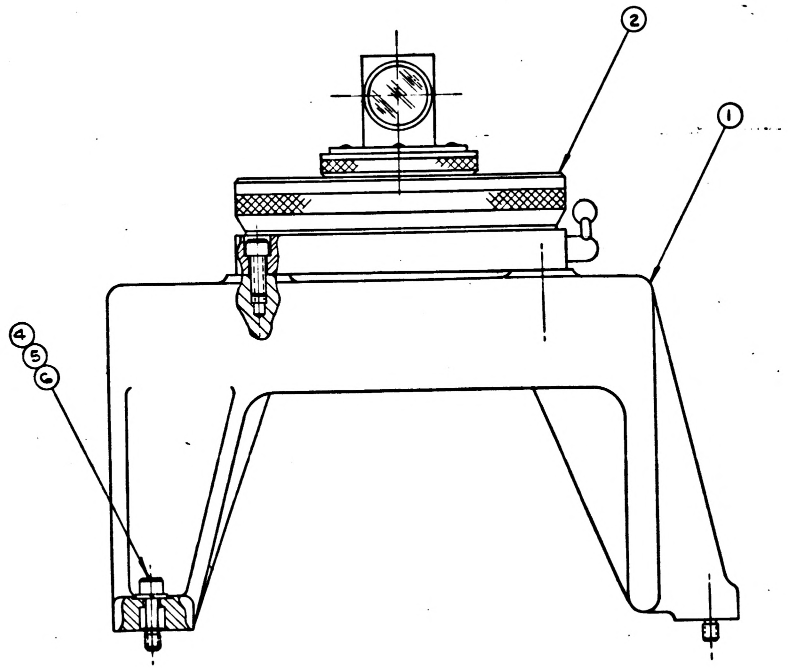
CODE IDENT NO. | SIZE E | NASA NUMBER 1019725
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

1019726

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327





FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05605 DATE 1/7/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	4		MS21318-2	74455064002		SCREW, DRIVE			
7	1		1019166	03386900702		PLATE, IDENTIFICATION			
6	3		MS16633-4018	7445308-1009		RING, RETAINING (E)			
5	3		MS35338-82	7443900 3006		WASHER, LOCK, SPLIT			
4	3		1019160	03386900659		SCREW, CAPTIVE			
3	4		1017418-33	7445505 8033		SCREW, CAP, SOC. HD. (1/4-20NC-3A × 5/8 LG)			
2	1		1017458	02386900044		POLYGON, OPTIC-MECHANICAL 5" SQUARE BASE			
1	1		1017184	03386900206		MOUNT, POLYGON (MACHINING)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900046

DRAWN Ringwald DATE 12-3-63
CHECKED J. Anderson 12-18-63
APPROVAL
APPROVAL 12-19-63
NASA APPROVAL
1-7-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOUNT, POLYGON
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019726
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF

MASTER

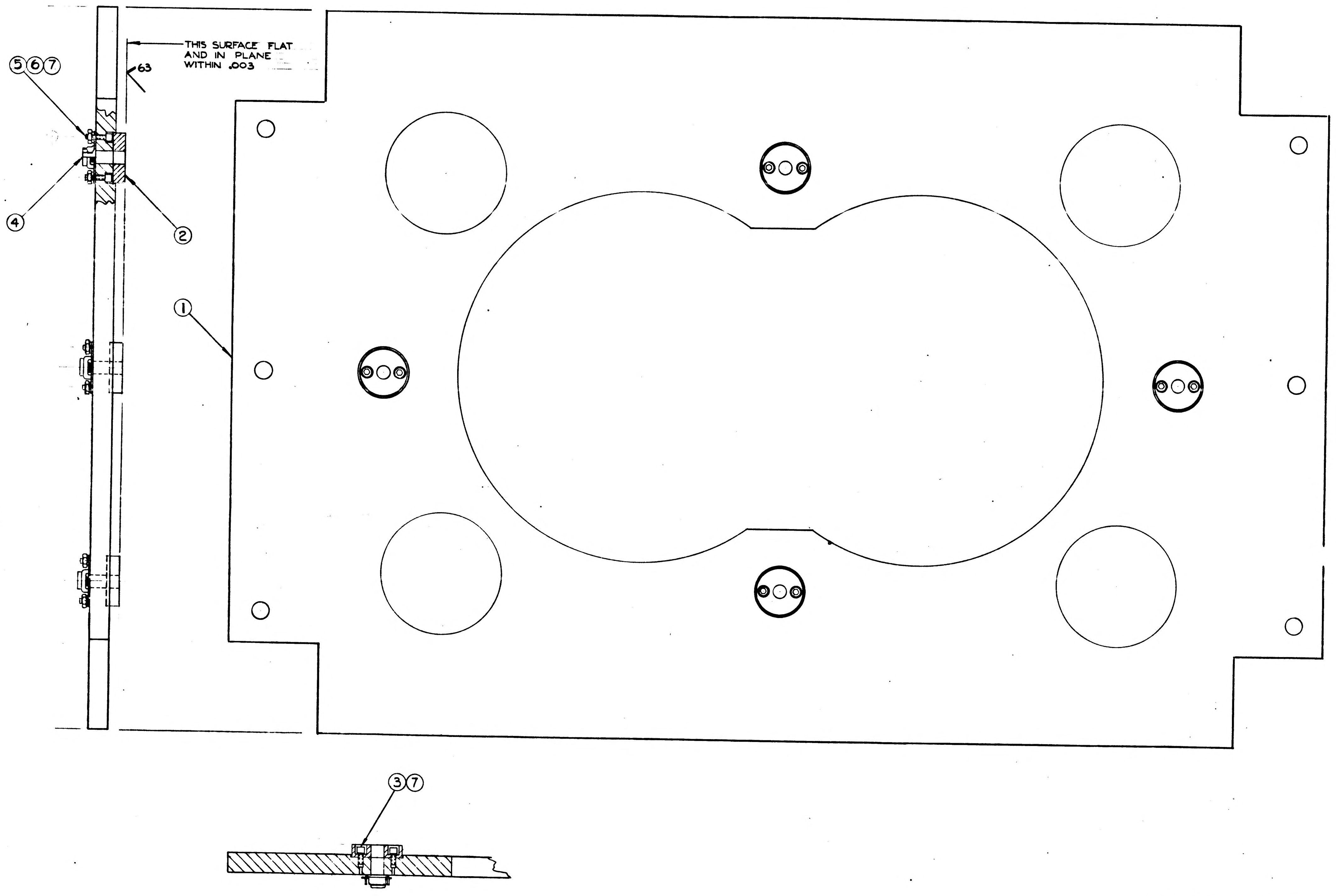
PHOTOGRAPHIC SCALE ONLY

1019727

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	8		MS-35338-78	74 43905 0002		WASHER, LOCK, SPLIT #4			
6	8		MS 35649-44	61 50105 1004		NUT, HEX 4-40			
5	8		1017418-11	74 45505 8011		SCREW, CAP, SOC. HD. 4-40 x 1/2			
4	4		1017494	03 38690 0665		ANCHOR NUT, FLOATING 22NA21-22-040 ESNA			
3	8		1017418-9	74 45505 8009		SCREW, CAP, SOC. HD. 4-40 x 1/4			
2	4		1019115	03 38690 0653		PAD			
1	1		1019116	03 38690 0654		PLATE, SUPPORT			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04721 DATE 11/19/63

NEXT ASSY	USED ON
1019729	1016954

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0128
DRAWN J.L.B. DATE 9/21/63
CHECKED
APPROVAL
APPROVAL 10-29-63
NASA APPROVAL 11-18-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PLATE ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019727
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

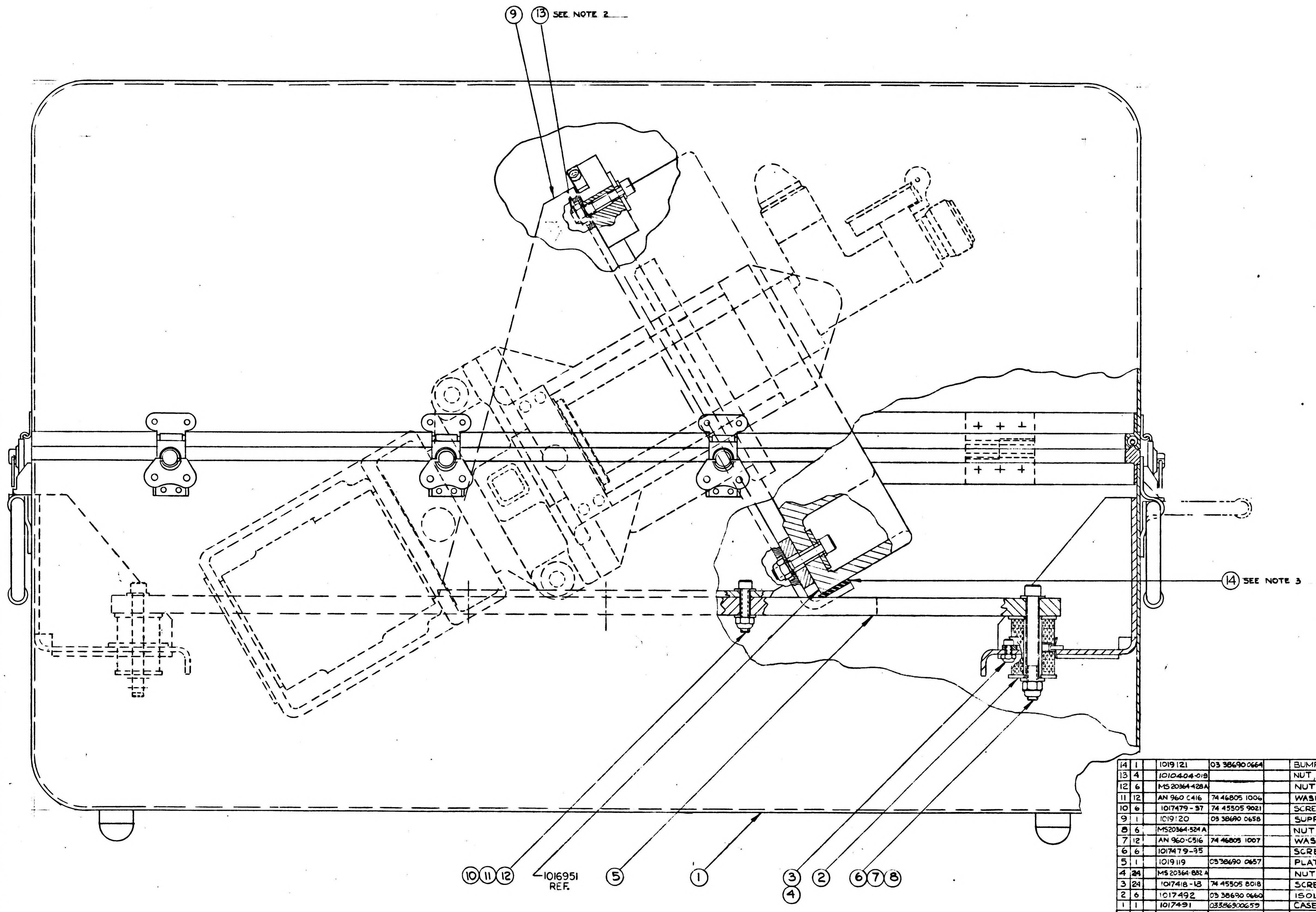
1019727

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019728

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLINCH SECURELY. REMOVE CLINCHED SHANK EXTENSION. FINISH FLUSH WITH SURFACE OF SUPPORT.
3. LOCATE CENTRALLY AT LOCATION SHOWN. CEMENT WITH EC-1357 PER MIL-A-1154.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	1		1019121	03 38690 0664		BUMPER			
13	4		1010404-019			NUT, CLINCH, SELF-LOCKING 5/16-24			
12	6		MS 20364-428A			NUT, SELF-LOCKING 1/4-28			
11	12		AN 960 C416	74 46805 1006		WASHER FLAT 1/4			
10	6		1017479-37	74 45505 9021		SCREW CAP, SOC. HD. 1/4-28 × 1 1/4			
9	1		1019120	03 38690 0658		SUPPORT			
8	6		MS20364-524 A			NUT, SELF-LOCKING 5/16-24			
7	12		AN 960-C516	74 46805 1007		WASHER, FLAT 5/16			
6	6		1017479-35			SCREW CAP. SOC. HD. 5/16-24 × 3			
5	1		1019119	03 38690 0657		PLATE SUPPORT			
4	24		MS 20364-832 A			NUT, SELF-LOCKING 8-32			
3	24		1017418-18	74 45505 8018		SCREW CAP. SOC. HD. 8-32 × 1/2			
2	6		1017492	03 38690 0660		ISOLATOR			
1	1		1017491	03386900659		CASE. STORAGE			

LIST OF PARTS AND MATERIALS

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04719 DATE 4/19/63

1016951	1016951
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0129
DRAWN J.L.S. DATE 10/1/63
CHECKED
APPROVAL
APPROVAL 10-23-63
NASA APPROVAL 11-8-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE, STORAGE ASSEM.
ALIGNMENT MIRROR ASSEM.

CODE IDENT NO. SIZE E NASA NUMBER 1019728
SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

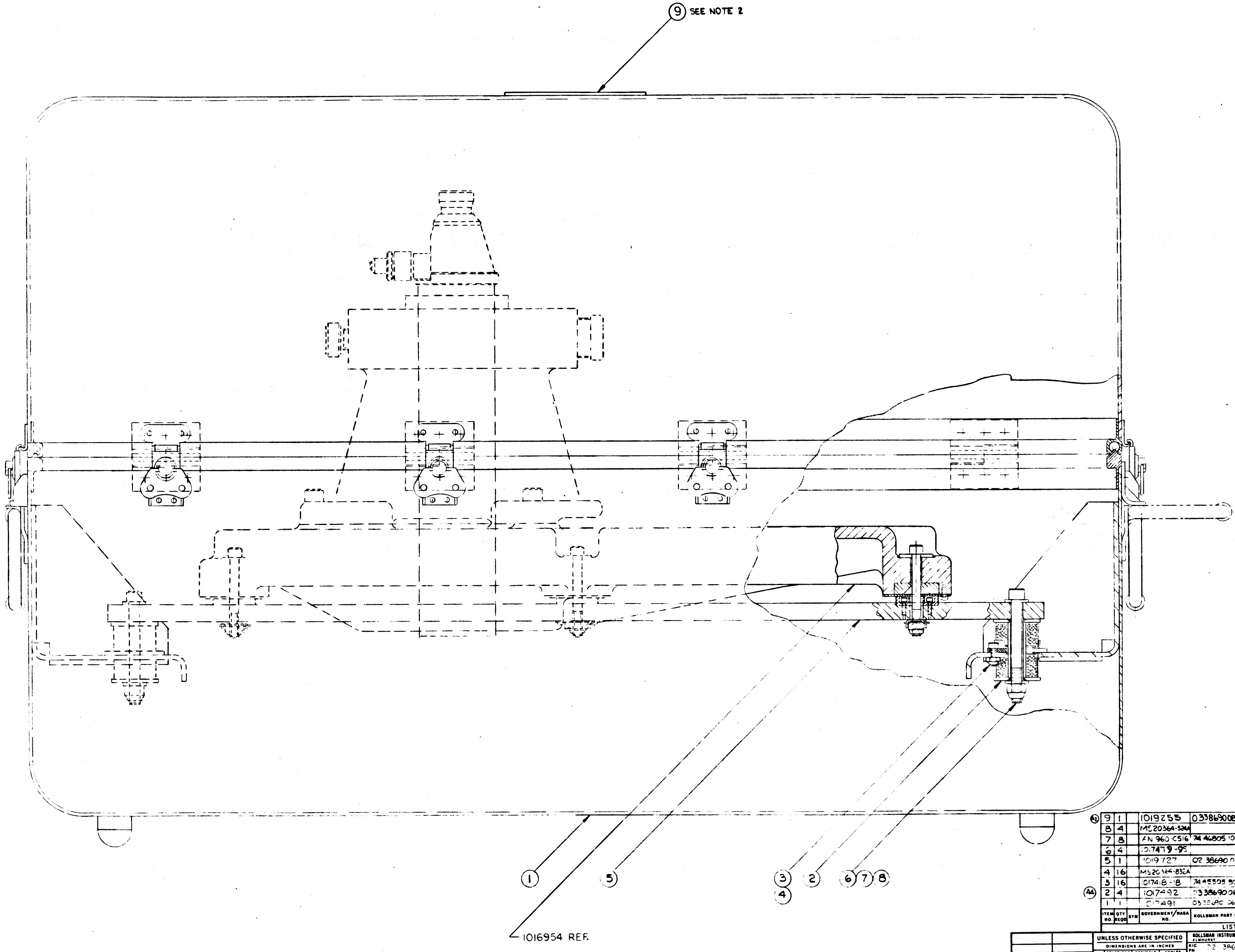
1019728

1019729 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 5 8 TDRR 142 DATE	2-25- A.S.A	

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. (A2) APPLY IDENTIFICATION PLATE NO. 1019255 USING EC 826 PER MIL-A-5092, CENTRALLY LOCATED TO TOP OF UNIT AS SHOWN



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	1		1019255	0338690 0818		PLATE IDENTIFICATION			
8	4		MS20364-524A			NUT SELF-LOCKING			
7	8		AN 960-C516	74 46805 1007		WASHER FLAT			
6	4		1017479-95			SCREW CAP SOC. HD.			
5	1		1019727	02 38690 0128		PLATE ASSEMBLY			
4	16		MS20364-832A			NUT SELF-LOCKING			
3	16		1017418-18	7445505 50 8		SCREW CAP SOC. HD.			
2	4		1017492	0338690 0660		ISOLATOR			
1	1		1017491	0338690 0659		CASE STORAGE			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 04721 DATE 11/19/63

NEXT ASSY	USED ON
1016954	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0 30
DRAWN W.L.S DATE 2-A-
CHECKED [illegible] 2-20-63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE STORAGE ASSY
YOKE POSITION FIXTURE

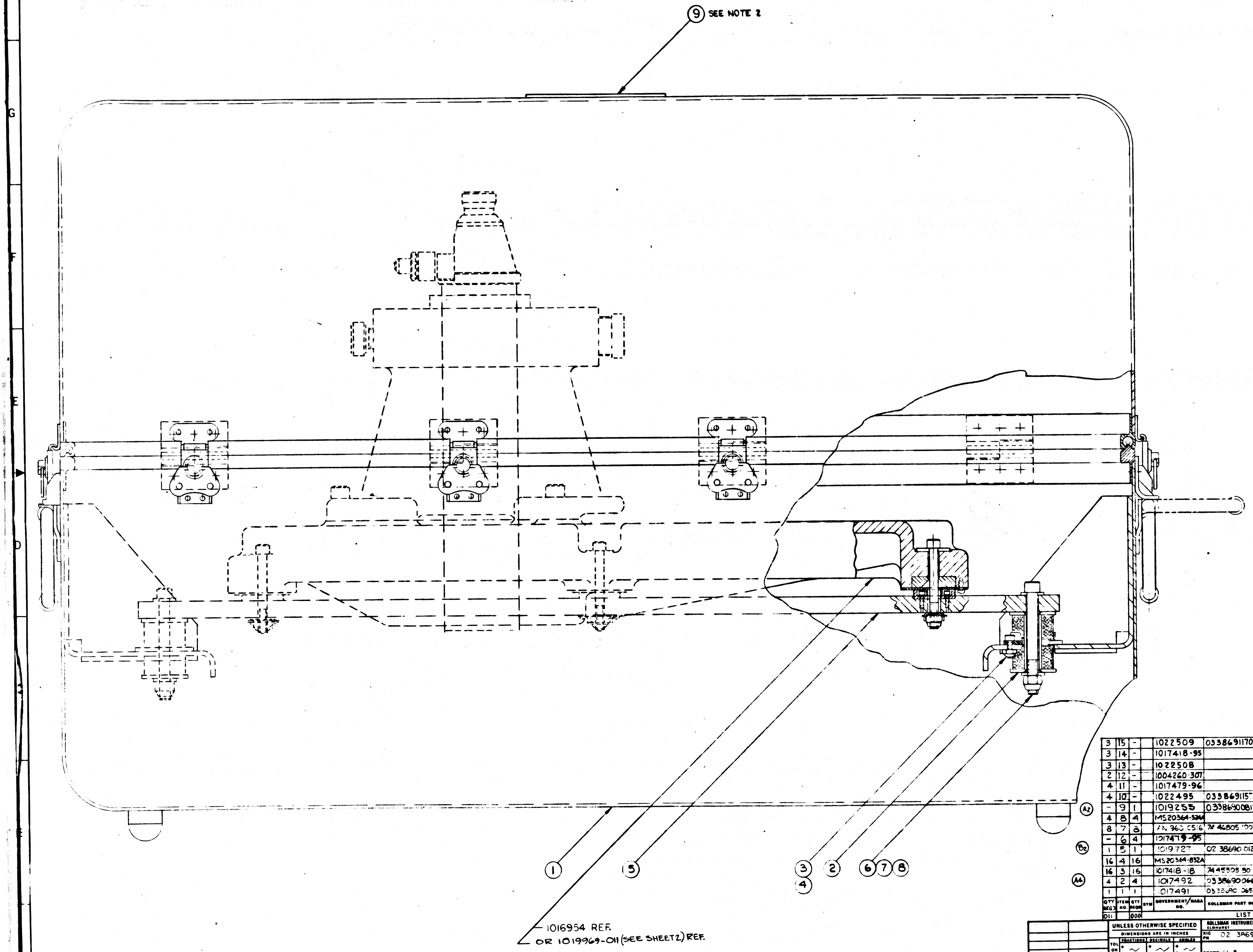
CODE IDENT NO.
SIZE E
NASA NUMBER 1019729
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019729 B

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 105181 TDRR 14268 DATE	2-25-6 A.S.A	WK
B3		REVISED PER ECO 10958 TDRR 21694 DATE 8-17-65	9-9-65	

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFICATION PLATE PART NO. 1019255 AND 100426-307 TO BE CENTRALLY LOCATED ON CASE TOP AND CEMENT IN PLACE PER ND1002219 (MIL-A-5092 TYPE III).



QTY REQ	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	15	-		1022509	03386911707		WASHER, NYLON			
3	14	-		1017418-95			SCREW, CAP. SOCKET HD			
3	13	-		1022508			WASHER, FLAT			
2	12	-		1004260-307			PLATE IDENTIFICATION			
4	11	-		1017479-96			SCREW, CAP SOCKET HD			
4	10	-		1022495	03386911572		SPACER			
-	9	1		1019255	03386900818		PLATE IDENTIFICATION			
4	8	4		MS20364-524A			NUT, SELF-LOCKING			
8	7	8		AN 960 C516	74 46805 1007		WASHER FLAT			
-	6	4		1017479-95			SCREW CAP SOC. HD			
1	5	1		1019727	02 38690 0128		PLATE ASSEMBLY			
16	4	16		MS20364-832A			NUT, SELF-LOCKING			
16	3	16		1017418-18	74 45505 30 8		SCREW CAP SOC. HD.			
4	2	4		1017492	03386900660		ISOLATOR			
1	1	1		1017491	03386900659		CASE STORAGE			
011		000								

LIST OF PARTS AND MATERIALS

1016954	1016910
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0130
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

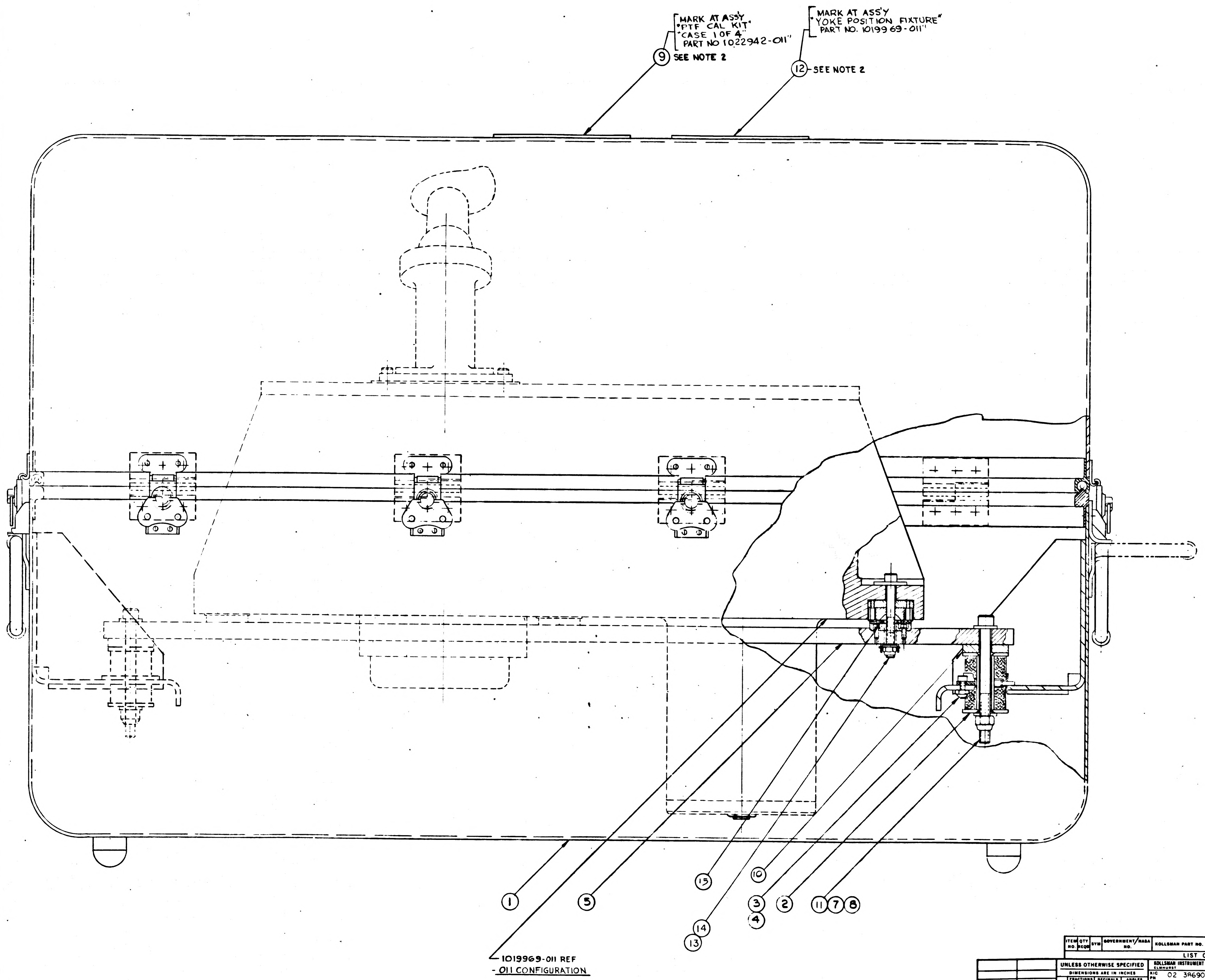
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE, STORAGE ASSY
YOKE POSITION FIXTURE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019729
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

B 1019729

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		ADDED NEW SHEET 2 OF 2 TDRR 2,694 DATE	65	


MARK AT ASS'Y
"PTF CAL KIT"
"CASE 1 OF 4"
PART NO 1022942-011"
9 SEE NOTE 2
MARK AT ASS'Y
"YOKE POSITION FIXTURE"
PART NO. 1019969-011"
12 SEE NOTE 2
1
5
15
14
13
10
3
4
2
11
7
8
1019969-011 REF
-011 CONFIGURATION

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019969	1016910
1016954	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0130
DRAWN A.L. [illegible] DATE 6-25-65
CHECKED [illegible] 6-25-65
APPROVAL [illegible] 6-25-65
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE, STORAGE ASSY
YOKE POSITION FIXTURE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019729
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

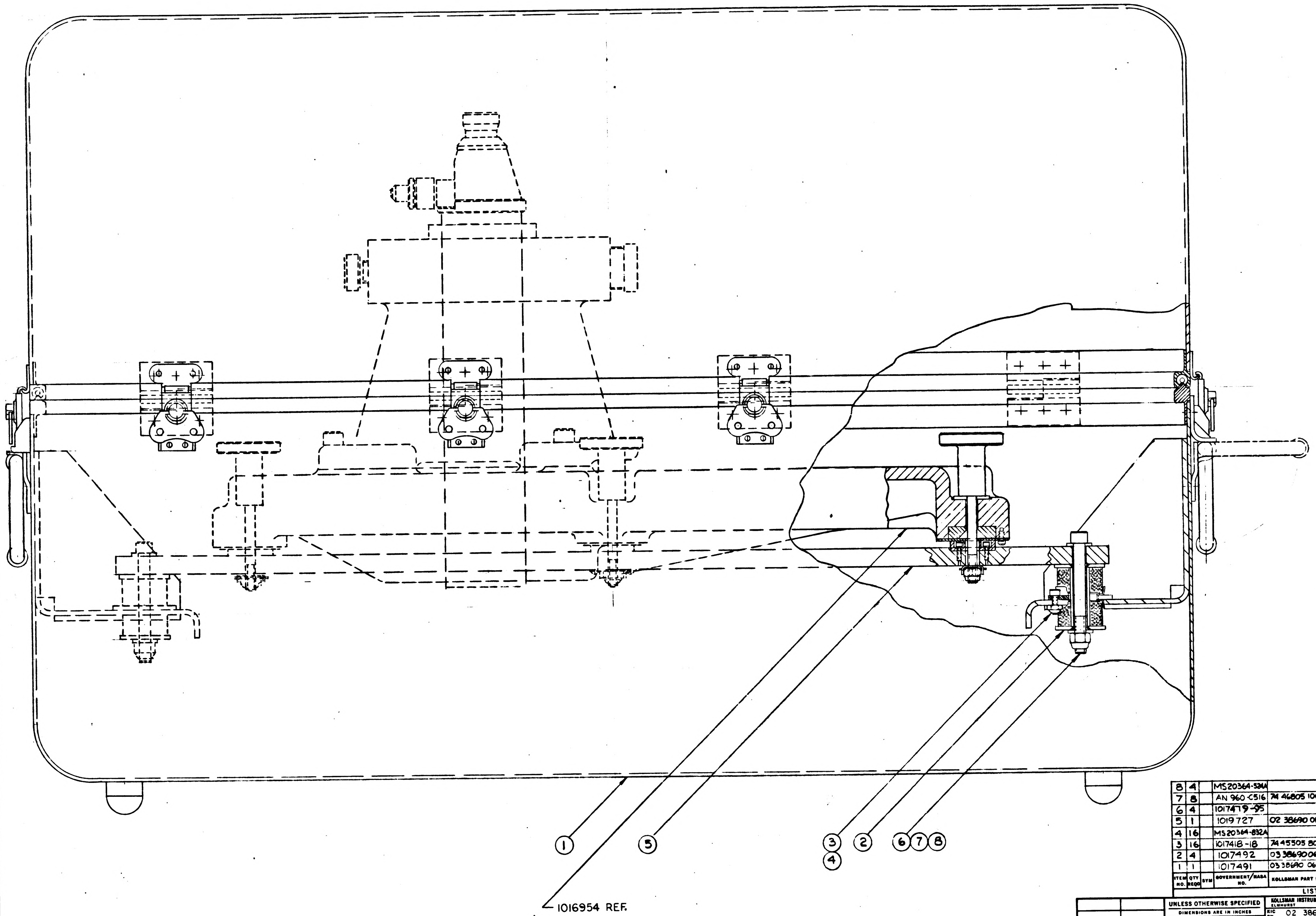
1019729

1019729

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	4		MS20364-524A			NUT, SELF-LOCKING		5/16-24	
7	8		AN 960-C516	74 46805 1007		WASHER, FLAT		5/16	
6	4		1017479-95			SCREW, CAP. SOC. HD.		5/16-24×3	
5	1		1019727	02 38690 0128		PLATE ASSEMBLY			
4	16		MS20364-832A			NUT, SELF-LOCKING		8-32	
3	16		1017418-18	74 45505 8018		SCREW CAP SOC. HD.		8-32×1/2	
2	4		1017492	03 38690 0660		SHOCK MOUNT			
1	1		1017491	03 38690 0659		CASE, STORAGE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016954	1016954

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02 38690 0130
DRAWN J.L.S. DATE 9-6-63
CHECKED B. Kolanski 10-28-63
APPROVAL
APPROVAL 10-24-63
NASA APPROVAL 11-8-63
MIT APPROVAL 11/19/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE, STORAGE ASSEM.
YOKE POSITION FIXTURE

CODE IDENT NO. | SIZE E | NASA NUMBER 1019729
SCALE 1:1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 04721 DATE 11/19/63

MASTER

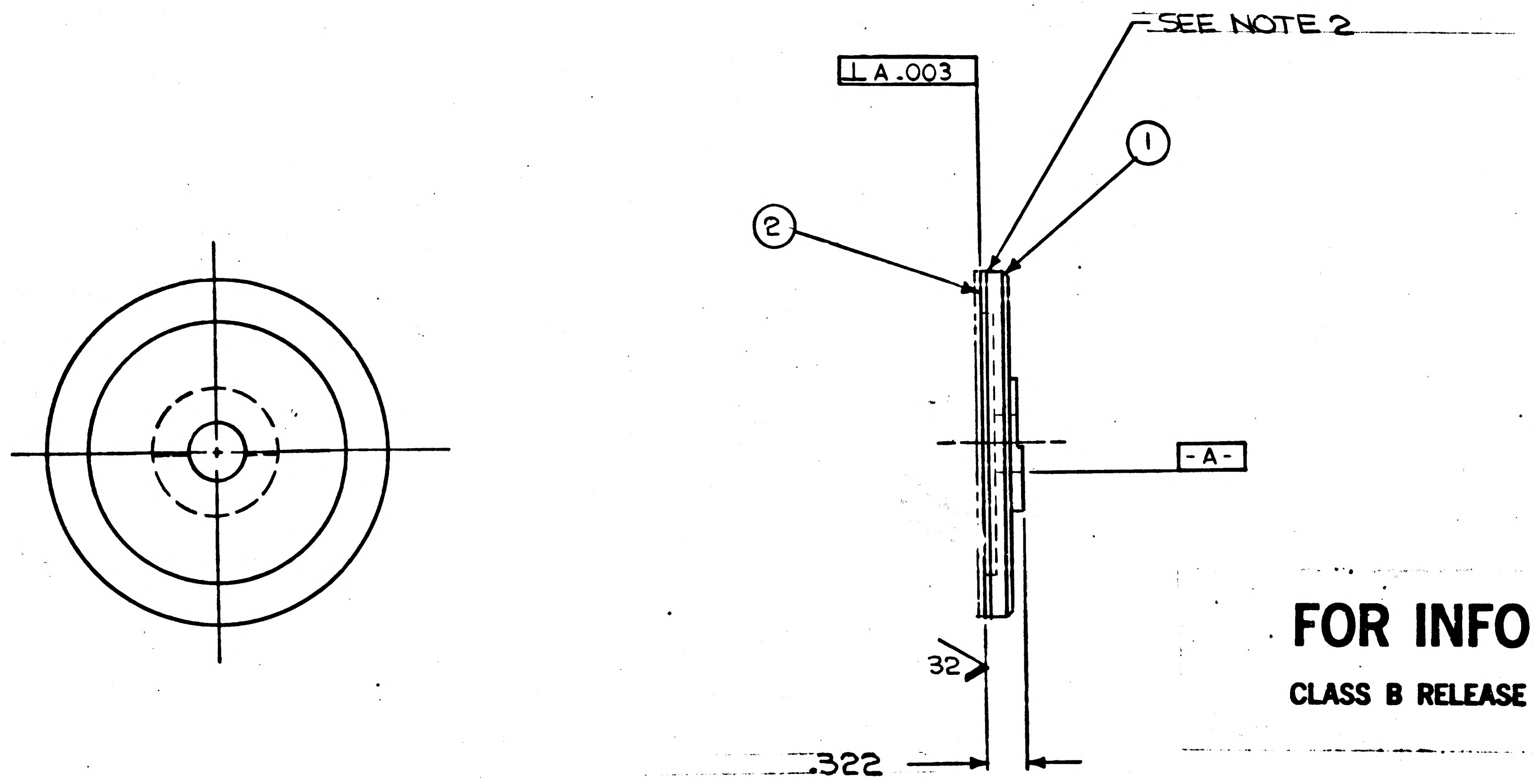
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1019730

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1- INTERPRET DWG PER MIL-D-70327
2- CEMENT PER MIL-A-5092 TYPE III



FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 04349 **DATE** 10/31/63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		1017125	03386900209		WASHER, NON METALLIC			
1	1		1017122	03386900215		DISK CLUTCH			

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
1016937	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900131
DRAWN Andolfi DATE 10/24/63
CHECKED 10/24/63
APPROVAL
APPROVAL 10-25-63
NASA APPROVAL 10-30-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DISK ASSY, CLUTCH

CODE IDENT NO.
SIZE C
NASA NUMBER 1019730
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

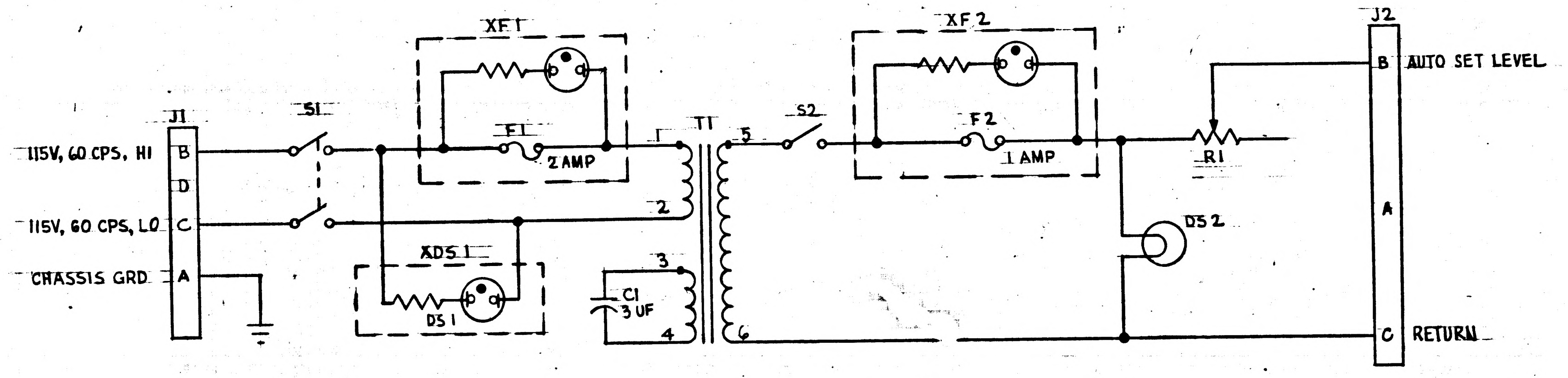
1019731

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. PARTS LIST TO BE FOR REFERENCE ONLY

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1017477	03386900626	CAPACITOR	3 UF	± 20%	600 V
DS1			1017463	68 25700 1901	LAMP GLOW (NEON)			
DS2			1017511-1	68 25700 0701	LAMP INCANDESCENT			
F1			MS90078-26		FUSE, CARTRIDGE			2 AMP
F2			MS90079-20	68 51000921	FUSE, CARTRIDGE			1 AMP
J1			MS3102R 14S 2P		CONNECTOR			
J2			MS3102 R 10SL 3S		CONNECTOR			
R1					RESISTOR, VAR			
S1			MS25307-22		SWITCH TOGGLE			
S2			MS25306-22		SWITCH TOGGLE			
T1			1017475	03386900625	TRANSFORMER			
XDS1			1017465	68 25100 2105	LAMP HOLDER			
XF1			1001667	68 15200 1406	FUSE HOLDER			
XF2			1001667	68 15200 1406	FUSE HOLDER			



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08140 **DATE** 5/5/64

REFERENCE DRAWING:
1. WIRING DIAGRAM - 1019770

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019767	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900161
DRAWN L MARGIOTTA DATE 3-16-64
CHECKED 3-25-64
APPROVAL
APPROVAL 3-25-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL ASSY
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019731
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET 1 OF

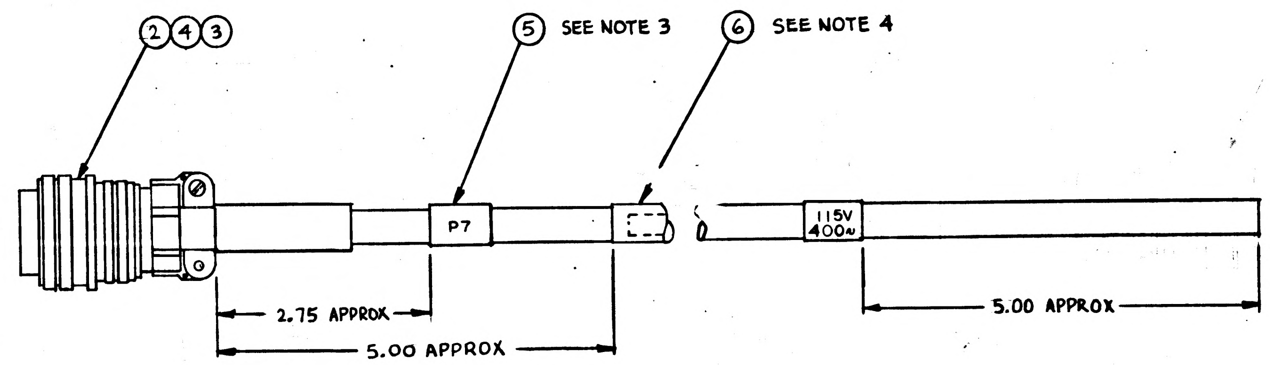
INCHES
0 1 2

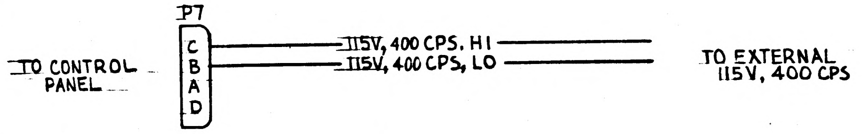
1019732

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. WIRE PER ND 1002032.
3. MARK PER ND 1002019, BOTH SIDES.
4. IDENTIFY USING PART NO. REV AND W NO. PER ND 1002019.

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	1	WHT	180"		P7-C	———	
		BLK			P7-B	———	





SCHEMATIC DIAGRAM
W1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 05030 DATE 10 Dec 63

REFERENCE DIAGRAM
1. INTERCONNECTION DIAGRAM 1019734

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1		1015865-460	60 02503 5056		INSULATION, SLEEVING (2" LG)			
5	2		1015865-160	60 02503 5056		INSULATION, SLEEVING (3/4" LG)			
4	2		1010490-112	60 02503 5006		INSULATION, SLEEVING (1/2" LG)			
3	1		MS3057-12A			CLAMP, CABLE			
2	1		MS3106A-22-22S			CONNECTOR, PLUG			
1	180"		CO-02MGF(2/16)0385	60 01508 8005		CABLE, ELECTRICAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016948	1016948

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130020
DRAWN J. MARGIOTTA DATE 11-11-63
CHECKED John Bruglia 11-26-63
APPROVAL
APPROVAL 11-26-63
NASA APPROVAL 12/4/63
12-9-63
MIT APPROVAL 12/10/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY,
POWER, ELECTRICAL
(W1)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019732
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET OF 1

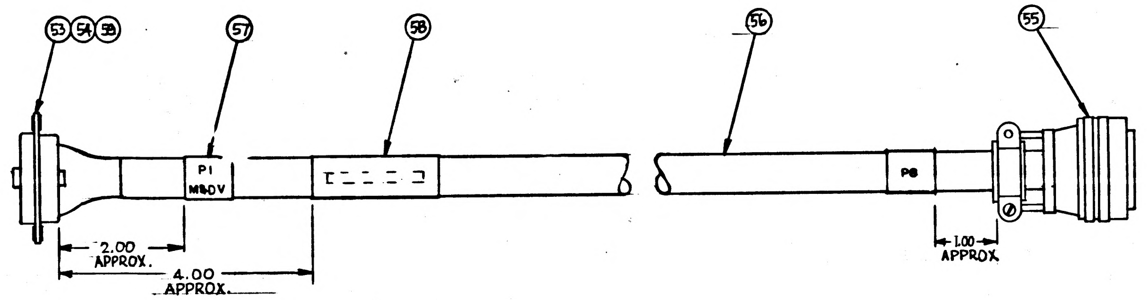
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1019733

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

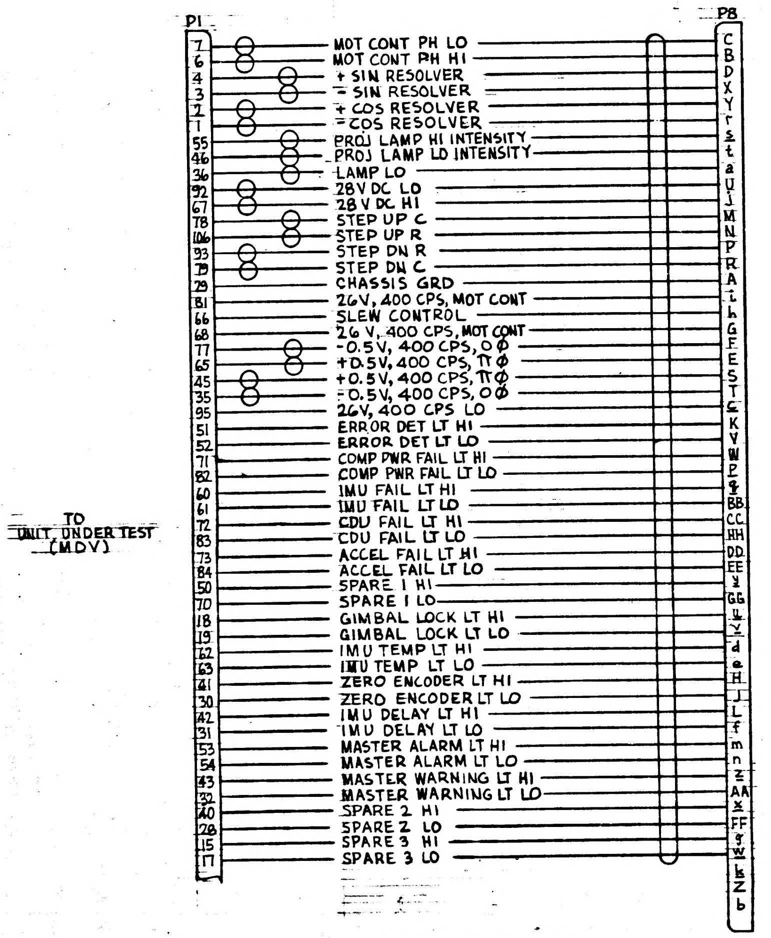
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002C.2
3. MARK PER ND 1002019 BOTH ENDS
4. MIL-I-631c, TYPE , FORM U, GRADE C, CLASS 1, CATEGORY 1, AWG 5/8.
5. IDENTIFY USING NASA PART NO., REV LETTER, MANUFACTURERS SYMBOL AND CABLE NUMBER ND 1002019
6. WIRE TO CONFORM WITH ND 1002181, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).

	CONDUCTOR NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
TWIST	1	1	BLK	120"		P1 - 7	P8 - C	
	2	2	BRN			6	B	
TWIST	3	3	RED			4	D	
	4	4	ORN			3	X	
TWIST	5	5	YEL			2	Y	
	6	6	GRN			1	r	
TWIST	7	7	BLU			55	s	
	8	8	VIO			46	t	
	9	9	GY			36	a	
TWIST	10	10	WHT			92	U	
	11	11	WHT - BLK			67	J	
TWIST	12	12	BRN			78	M	
	13	13	RED			106	N	
TWIST	14	14	ORN			93	P	
	15	15	YEL			79	R	
	16	16	GRN			29	A	
	17	17	BLU			81	i	
	18	18	VIO			66	h	
	19	19	GY			68	G	
TWIST	20	20	BLK - BRN			77	F	
	21	21	RED			65	E	
TWIST	22	22	ORN			45	S	
	23	23	YEL			35	T	
	24	24	GRN			95	c	
	25	25	BLU			51	K	
	26	26	VIO			52	V	
	27	27	BLK - GY			71	W	
	28	28	BRN - RED			82	p	
	29	29	ORN			60	q	
	30	30	YEL			61	BB	
	31	31	GRN			72	CC	
	32	32	BLU			83	HH	
	33	33	VIO			73	DD	
	34	34	BRN - GY			84	EE	
	35	35	RED - ORN			50	y	
	36	36	YEL			70	GG	
	37	37	GRN			18	u	
	38	38	BLU			19	v	
	39	39	VIO			62	d	
	40	40	RED - GY			63	e	
	41	41	ORN - YEL			41	H	
	42	42	GRN			30	J	
	43	43	BLU			42	L	
	44	44	VIO			31	f	
	45	45	ORN - GY			53	m	
	46	46	YEL - GRN			54	n	
	47	47	BLU			43	z	
	48	48	VIO			32	AA	
	49	49	YEL - GY			40	x	
	50	50	GRN - BLU			28	FF	
	51	51	GRN - VIO			15	g	
	52	52	WHT - GRN - GY	120"		P1 - 17	P8 - w	


53
54
58
57
P1
MSDV
58
56
55
P8
2.00 APPROX.
4.00 APPROX.
1.00 APPROX

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
59	1		PENDING			CLAMP, CABLE			
58	1		1015865-454	6002503506l		INSULATION, SLEEVING (2" LG)			
57	2		1015865-154	6002503506l		INSULATION, SLEEVING (3/4" LG)			
56			SEE NOTE 5	600250500004		INSULATION, SLEEVING (117" LG)			
55	1		MS3126F2255P			CONNECTOR, PLUG			
54	55		1010464-2			CONTACT, ELECTRICAL			
53	1		1010411-1			CONNECTOR, RECEP, ELEC.			
52	120"		MIL-W-16878/1 B22	60 60105 2252		WIRE, ELECTRICAL (WHT-GRN-GY) (SEE NOTE 6)			
51			MIL-W-16878/1 B22	60 60105 2251		WIRE, ELECTRICAL (GRN-VIO)			
50				2250		(GRN-BLU)			
49				2249		(YEL-GY)			
48				2248		(VIO)			
47				2247		(BLU)			
46				2246		(YEL-GRN)			
45				2245		(ORN-GY)			
44				2244		(VIO)			
43				2243		(BLU)			
42				2242		(GRN)			
41				2241		(ORN-YEL)			
40				2240		(RED-GY)			
39				2239		(VIO)			
38				2238		(BLU)			
37				2237		(GRN)			
36				2236		(YEL)			
35				2235		(RED-ORN)			
34				2234		(BRN-GY)			
33				2233		(VIO)			
32				2232		(BLU)			
31				2231		(GRN)			
30				2230		(YEL)			
29				2229		(ORN)			
28				2228		(BRN-RED)			
27				2227		(BLK-GY)			
26				2226		(VIO)			
25				2225		(BLU)			
24				2224		(GRN)			
23				2223		(YEL)			
22				2222		(ORN)			
21				2221		(RED)			
20				2220		(BLK-BRN)			
19				2219		(GY)			
18				2218		(VIO)			
17				2217		(BLU)			
16				2216		(GRN)			
15				2215		(YEL)			
14				2214		(ORN)			
13				2213		(RED)			
12				2212		(BRN)			
11				2211		(WHT-BLK)			
10				2210		(WHT)			
9				2209		(GY)			
8				2208		(VIO)			
7				2207		(BLU)			
6				2206		(GRN)			
5				2205		(YEL)			
4				2204		(ORN)			
3				2203		(RED)			
2				2202		(BRN)			
1	120"		MIL-W-16878/1 B22	60 60105 2201		WIRE, ELECTRICAL (BLK)		(SEE NOTE 6	

LIST OF PARTS AND MATERIALS


P1
P8
TO UNIT UNDER TEST (MDV)
TO CONTROL PANEL
7 MOT CONT PH LO C
6 MOT CONT PH HI B
4 + SIN RESOLVER D
3 − SIN RESOLVER X
2 + COS RESOLVER Y
1 − COS RESOLVER r
55 PROJ LAMP HI INTENSITY s
46 PROJ LAMP LO INTENSITY t
36 LAMP LO a
92 28V DC LO U
67 28 V DC HI J
78 STEP UP C M
106 STEP UP R N
93 STEP DN R P
79 STEP DN C R
29 CHASSIS GRD A
81 26V, 400 CPS, MOT CONT i
66 SLEW CONTROL h
68 26 V, 400 CPS, MOT CONT G
77 -0.5V, 400 CPS, 0 Ø F
65 +0.5V, 400 CPS, π Ø E
45 +0.5V, 400 CPS, π Ø S
35 -0.5V, 400 CPS, 0 Ø T
95 26V, 400 CPS LO c
51 ERROR DET LT HI K
52 ERROR DET LT LO V
71 COMP PWR FAIL LT HI W
82 COMP PWR FAIL LT LO p
60 IMU FAIL LT HI q
61 IMU FAIL LT LO BB
72 CDU FAIL LT HI CC
83 CDU FAIL LT LO HH
73 ACCEL FAIL LT HI DD
84 ACCEL FAIL LT LO EE
50 SPARE 1 HI y
70 SPARE 1 LO GG
18 GIMBAL LOCK LT HI u
19 GIMBAL LOCK LT LO v
62 IMU TEMP LT HI d
63 IMU TEMP LT LO e
41 ZERO ENCODER LT HI H
30 ZERO ENCODER LT LO J
42 IMU DELAY LT HI L
31 IMU DELAY LT LO f
53 MASTER ALARM LT HI m
54 MASTER ALARM LT LO n
43 MASTER WARNING LT HI z
32 MASTER WARNING LT LO AA
40 SPARE 2 HI x
28 SPARE 2 LO FF
15 SPARE 3 HI g
17 SPARE 3 LO w
k
Z
b

SCHEMATIC DIAGRAM
W2

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019734

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 01030 DATE 10 Dec 63

MASTER

1016948	1016948
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 17020130 0050
DRAWN IMARGIOTTA DATE 11-15-63
CHECKED 11-16-63
APPROVAL
APPROVAL 11-26-63
NASA APPROVAL 12-4-63
MIT APPROVAL 12/11/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

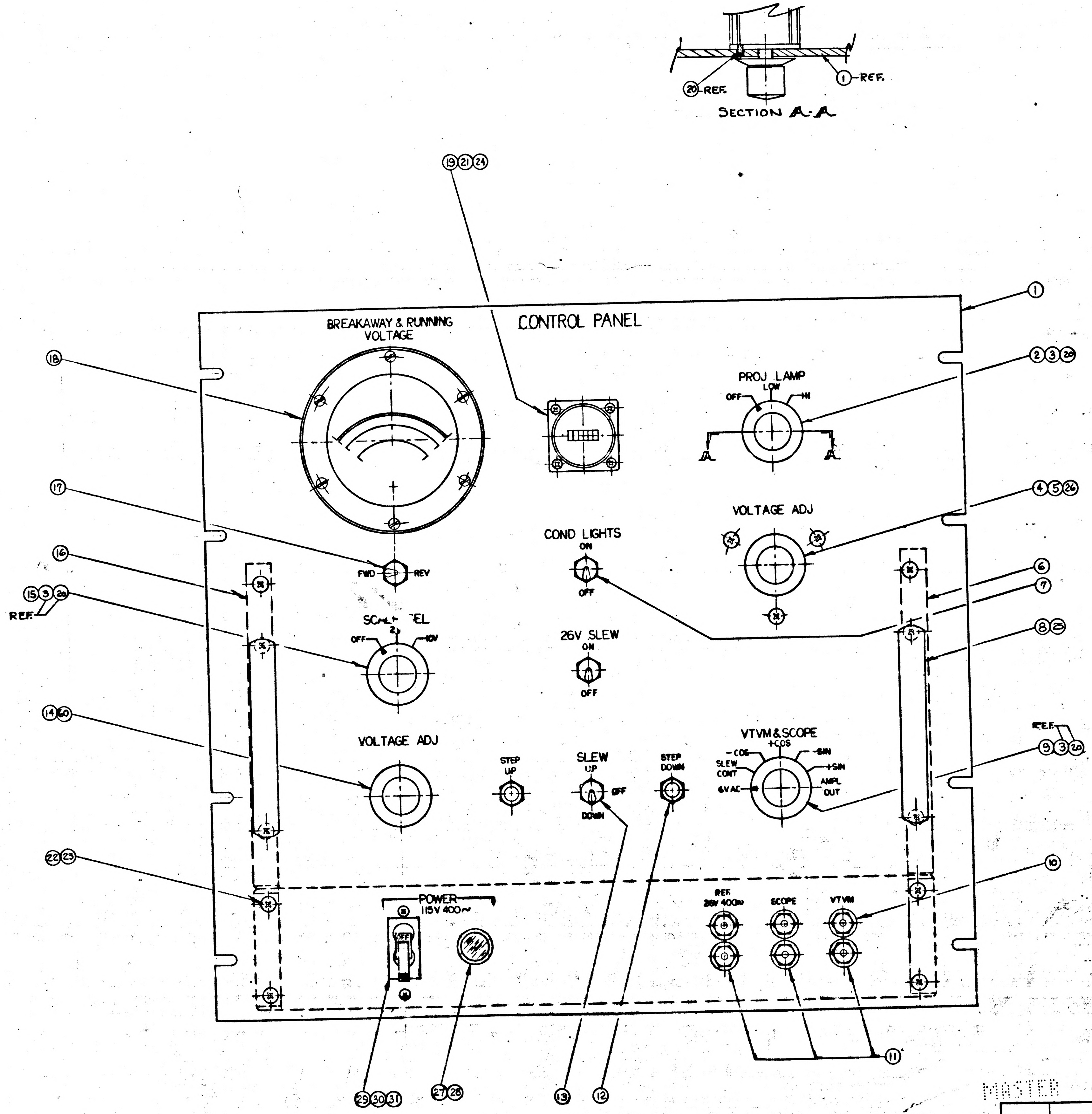
TITLE CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W2)

CODE IDENT NO. SIZE E NASA NUMBER 1019733
SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.


⑳-REF.
①-REF.
SECTION A-A
⑲㉑㉔
CONTROL PANEL
BREAKAWAY & RUNNING VOLTAGE
①
⑱
PROJ LAMP
LOW
OFF
HI
A
A
②③㉖
⑰
④⑤㉖
VOLTAGE ADJ
COND LIGHTS
ON
OFF
FWD
REV
⑯
⑥
⑦
⑮③⑳
REF.
SCALE SEL
OFF
2
10
⑧㉕
26V SLEW
ON
OFF
⑭⑩
VOLTAGE ADJ
STEP UP
SLEW
UP
OFF
DOWN
STEP DOWN
VTVM & SCOPE
+COS
-COS
-SIN
+SIN
SLEW CONT
6V AC
AMPL OUT
REF.
⑨③⑳
㉒㉓
⑩
POWER
115V 400~
OFF
REF 26V 400~
SCOPE
VTVM
⑪
㉙㉚㉛
㉗㉘
⑬
⑫

CONTINUED ON SHEET 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
31	2		MS35333-71			LOCKWASHER, INTERNAL TOOTH			
30	2		MS35216-25			SCREW, CROSS REC.			
29	1		PENDING			CIRCUIT BREAKER (HEINEMANN #AM12, 5A, 115V 400CPS [illegible])			
28	1		1017463	68257001901		LAMP			
27	1		1017465	68251002105		HOLDER, LAMP			
26	3		MS 35201-54			SCR, FLAT HD., CROSS REC. #10-32 × 7/16			
25	4		MS 35217-55			SCR, PAN HD, CROSS REC. #10-32 × 1/2 L.			
24	15		MS20365-440			NUT, HEX, SELF LOCK #4-40			
23	18		MS20365-1032			NUT, HEX, SELF LOCK #10-32			
22	12		MS35217-57			SCR. PAN HD, CROSS REC. #10-32 × 3/4 L.			
21	4		MS35216-16			SCR. PAN HD. CROSS REC. #4-40 × 1/2 L.			
20	3		MS51029-18			SET SCR., HEX. SOCKET, #6-32 × 1/4 L.			
19	1		PENDING			INDICATOR, TIME ELAPSE (A.W. HAYDON #7010-009)			
18	1		1017460-5	68421001105		VOLTMETER, AC			
17	1		MS25307-23			SWITCH, TOGGLE, DP. DT., ON-N-OFF			
16	1		1019032	16020110210		BRACKET, LEFT HAND			
15	1		1017505-1	160201300804		SWITCH, ROTARY			
14	1		1017484	68400150501		TRANSFORMER, VARIABLE			
13	1		MS25307-27			SWITCH, TOGGLE, DP DT., MOM ON - OFF - MOM ON			
12	2		1017501	16020130160		SWITCH, PUSH BUTTON			
11	3		1017495-1	68266000501		POST, BINDING, BLK.			
10	3		1017495-2	68266000502		POST, BINDING, RED			
9	1					SWITCH, ROT., 2POLE, 7POS.			
8	2		1017493	74429003002		HANDLE			
7	2		MS25306-22			SWITCH TOGGLE, SP. ST., ON-N-OFF			
6	1		1019044	16020110330		BRACKET RH.			
5	1		1019148	16020130130		KNOB, NO POINTER			
4	1		1016035	68400160101		TRANSFORMER, VARIABLE			
3	3		MS91528C-2F-2B			KNOB/POINTER			
2	1					SWITCH, ROT. 4POLE, 3POS.			
1	1		1019127	16020130060		PANEL, CONTROL			

LIST OF PARTS AND MATERIALS

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05030 DATE 10 Jan 63

1016948	1016948
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130050
DRAWN R.M. DeCarlo DATE 10-14-63
CHECKED John [illegible] 11-19-63
APPROVAL
APPROVAL [illegible] 11-19-63
NASA APPROVAL [illegible]
[illegible] 1-9-63
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

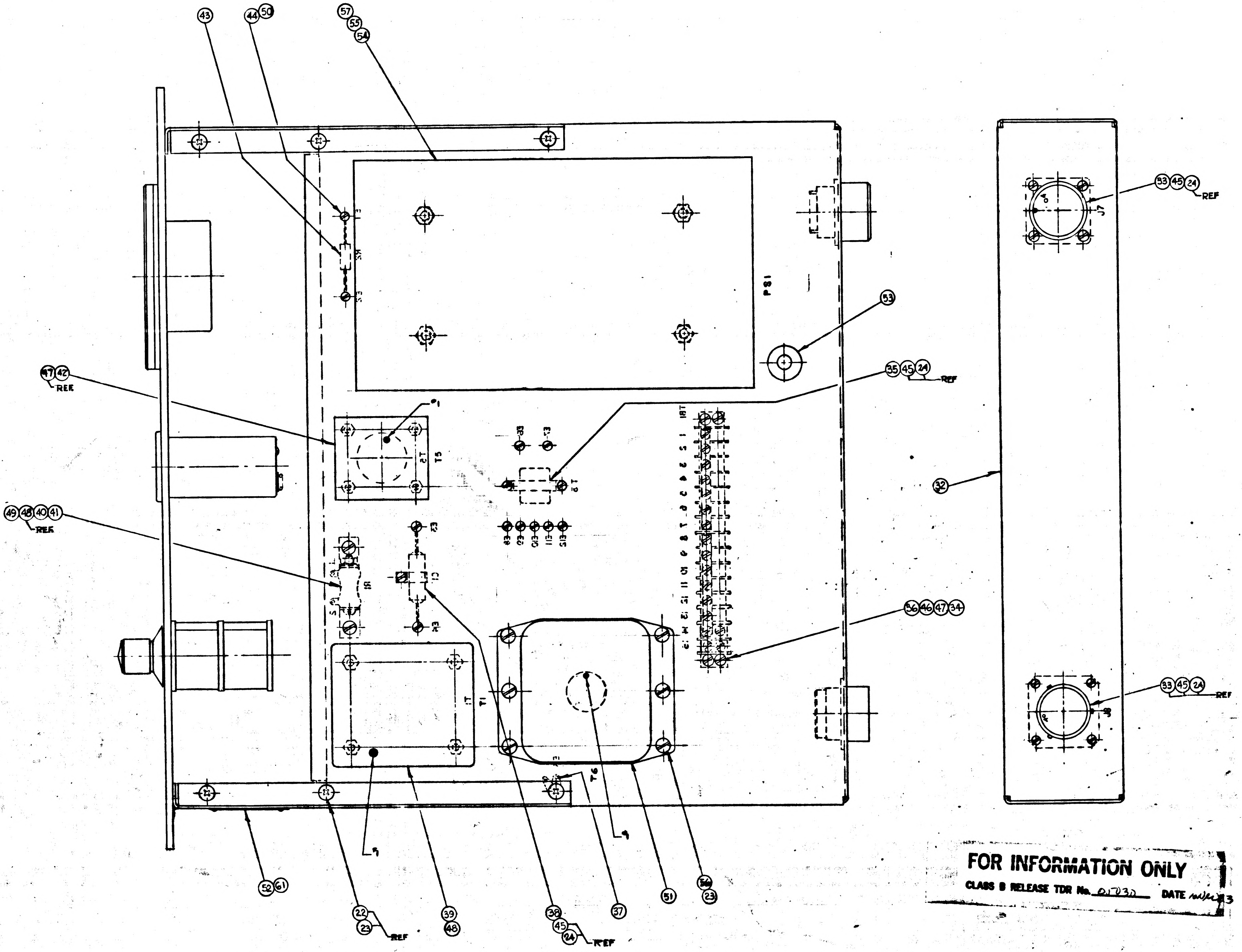
TITLE
PANEL ASSY, CONTROL
(MAP & DATA VIEWER TESTER)

CODE IDENT NO.
SIZE E
NASA NUMBER 1019735
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1019735

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 01030 DATE [illegible]3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
61	4		MS21318-2	74455064002		SCREW, DRIVE ROUND HEAD			
60	1		MS91528C-26-2B			KNOB, NO POINTER			
59	REF		1019742	17020130010		SCHEMATIC			
58	REF		1019736	17020130060		WIRING DIAGRAM			
57	4		MS35338-82	74439003006		LOCKWASHER (# 1/4)			
56	6		MS35234-63			SCREW, PAN HD, SLOTTED #10-32NF-2A			
55	4		MS35690-410	61501051040		NUT, HEX (# 1/4-20)			
54	1		1017457	16020110620		POWER SUPPLY			
53	1		MS35489-11	74428010011		GROMMET			
52	1		1019131	16020130070		PLATE, IDENTIFICATION			
51	1		1017421	16020130140		TRANSFORMER			
50	11		MS35233-11			SCREW, PAN HD (#4-40 x 1/8 LG)			
49	2		MS35233-45			SCREW, PAN HD (#8-32 x 1/2 LG)			
48	6		MS20365-832			NUT, HEX, SELF LOCKING (#8-32)			
47	8		MS20365-632			NUT, HEX, SELF LOCKING (#6-32)			
46	4		MS35233-30			SCREW, PAN HD, (#6-32 x 1/2 LG)			
45	11		MS35233-15			SCREW, PAN HD (#4-40 x 3/8 LG)			
44	11		1017488-2	68101016102		TERMINAL, STAND-OFF, INS.			
43	1		1017460-2	68421001102		RESISTOR, FIXED, 8K Ω ± 1%, 1WATT			
42	1		1017462	68400183901		TRANSFORMER			
41	1		MS75009-30			BRACKET, RESISTOR			
40	1		RW30Y151			RESISTOR, FIXED, 150 Ω, 11 WATTS			
39	1		MS90022-2			TRANSFORMER			
38	1		CP12A1KC104K3	69100302089		CAPACITOR, FIXED, .1MFD ± 10%, 200V			
37	2		PENDING	68100004101		TERMINAL LUG, (#10 STUD)			
36	1		PENDING	68102001814		BOARD, TERMINAL (BARRIER TYPE)			
35	1		1011414	68400023301		TRANSFORMER			
34	11		1015894-002			JUMPER			
33	1		1019739	17020130070		HARNESS ASSY			
32	1		1019126	16020130050		CHASSIS			

LIST OF PARTS AND MATERIALS

1016948	1016948
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130050
DRAWN R.M. DeCosta DATE 10-22-63
CHECKED [illegible] 11-4-63
APPROVAL
APPROVAL [illegible] 1-15-63
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSY, CONTROL
(MAP & DATA VIEWER TESTER)

CODE IDENT NO.
SIZE E
NASA NUMBER 1019735
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

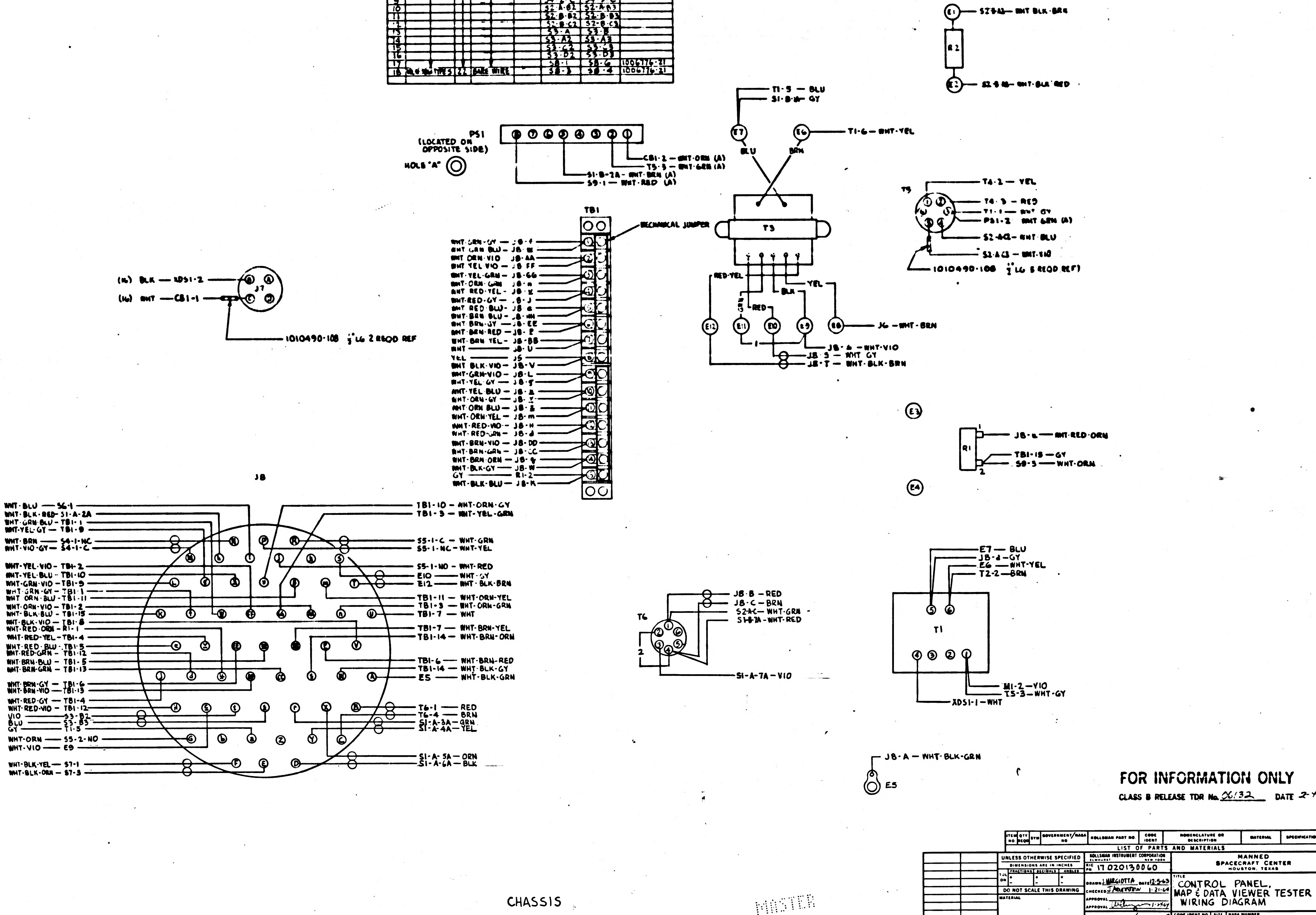
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

1019736

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

COND NO	PART NO. REF	AWG SIZE	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	MIL-W-3861 TYPE S	22	BARE WIRE		E9	E11	1006776-21
2					T6-2	T6-4	1006776-21
3					S1-B-2A	S1-B-3A	
4					S1-B-3A	S1-B-4A	
5					S1-B-4A	S1-B-5A	
6					S1-B-5A	S1-B-6A	
7					S5-2-C	S5-3-C	
8					S7-4	S7-6	1006776-21
9					S4-2-C	S4-3-C	
10					S2-A-B2	S2-A-B3	
11					S2-B-B2	S2-B-B3	
12					S2-B-C2	S2-B-C3	
13					S3-A	S3-B	
14					S3-A2	S3-A3	
15					S3-C2	S3-C3	
16					S3-D2	S3-D3	
17					S8-1	S8-6	1006776-21
18	MIL-W-3861 TYPE S	22	BARE WIRE		S8-3	S8-4	1006776-21


E1 — S2-B-A3 — WHT-BLK-BRN
R2
E2 — S2-B-B1 — WHT-BLK-RED
PS1
(LOCATED ON OPPOSITE SIDE)
HOLE "A"
CB1-2 — WHT-ORN (A)
T5-3 — WHT-GRN (A)
S1-B-2A — WHT-BRN (A)
S9-1 — WHT-RED (A)
T1-5 — BLU
S1-B-1A — GY
E7
E6 — T1-6 — WHT-YEL
BLU
BRN
T3
MECHANICAL JUMPER
RED-YEL
GRN
RED
BLK
YEL
E12
E11
E10
E9
E8 — J6 — WHT-BRN
J8-a — WHT-VIO
J8-S — WHT-GY
J8-T — WHT-BLK-BRN
T5
T4-2 — YEL
T4-3 — RED
T1-1 — WHT-GY
PS1-2 — WHT-GRN (A)
S2-A-C2 — WHT-BLU
S2-A-C3 — WHT-VIO
1010490-108 ½" LG 5 REQD REF
TB1
WHT-GRN-GY — J8-f
WHT-GRN-BLU — J8-M
WHT-ORN-VIO — J8-AA
WHT-YEL-VIO — J8-FF
WHT-YEL-GRN — J8-GG
WHT-ORN-GRN — J8-n
WHT-RED-YEL — J8-X
WHT-RED-GY — J8-J
WHT-RED-BLU — J8-e
WHT-BRN-BLU — J8-HH
WHT-BRN-GY — J8-EE
WHT-BRN-RED — J8-P
WHT-BRN-YEL — J8-BB
WHT — J8-U
YEL — J5
WHT-BLK-VIO — J8-V
WHT-GRN-VIO — J8-L
WHT-YEL-GY — J8-g
WHT-YEL-BLU — J8-z
WHT-ORN-GY — J8-y
WHT-ORN-BLU — J8-Z
WHT-ORN-YEL — J8-m
WHT-RED-VIO — J8-H
WHT-RED-GRN — J8-d
WHT-BRN-VIO — J8-DD
WHT-BRN-GRN — J8-CC
WHT-BRN-ORN — J8-q
WHT-BLK-GY — J8-W
GY — R1-2
WHT-BLK-BLU — J8-K
(16) BLK — XDS1-2
(16) WHT — CB1-1
J7
1010490-108 ½" LG 2 REQD REF
E3
R1
J8-c — WHT-RED-ORN
TB1-15 — GY
S9-3 — WHT-ORN
E4
J8
WHT-BLU — S6-1
WHT-BLK-RED — S1-A-2A
WHT-GRN-BLU — TB1-1
WHT-YEL-GY — TB1-9
WHT-BRN — S4-1-NC
WHT-VIO-GY — S4-1-C
WHT-YEL-VIO — TB1-2
WHT-YEL-BLU — TB1-10
WHT-GRN-VIO — TB1-9
WHT-GRN-GY — TB1-1
WHT ORN-BLU — TB1-11
WHT-ORN-VIO — TB1-2
WHT-BLK-BLU — TB1-15
WHT-BLK-VIO — TB1-8
WHT-RED-ORN — R1-1
WHT-RED-YEL — TB1-4
WHT-RED-BLU — TB1-5
WHT-RED-GRN — TB1-12
WHT-BRN-BLU — TB1-5
WHT-BRN-GRN — TB1-13
WHT-BRN-GY — TB1-6
WHT-BRN-VIO — TB1-13
WHT-RED-GY — TB1-4
WHT-RED-VIO — TB1-12
VIO — S3-B2
BLU — S3-B3
GY — T1-5
WHT-ORN — S5-2-NO
WHT-VIO — E9
WHT-BLK-YEL — S7-1
WHT-BLK-ORN — S7-3
TB1-10 — WHT-ORN-GY
TB1-3 — WHT-YEL-GRN
S5-1-C — WHT-GRN
S5-1-NC — WHT-YEL
S5-1-NO — WHT-RED
E10 — WHT-GY
E12 — WHT-BLK-BRN
TB1-11 — WHT-ORN-YEL
TB1-3 — WHT-ORN-GRN
TB1-7 — WHT
TB1-7 — WHT-BRN-YEL
TB1-14 — WHT-BRN-ORN
TB1-6 — WHT-BRN-RED
TB1-14 — WHT-BLK-GY
E5 — WHT-BLK-GRN
T6-1 — RED
T6-4 — BRN
S1-A-3A — GRN
S1-A-4A — YEL
S1-A-5A — ORN
S1-A-6A — BLK
T6
J8-B — RED
J8-C — BRN
S2-A-C — WHT-GRN
S1-B-7A — WHT-RED
S1-A-7A — VIO
2
T1
E7 — BLU
J8-d — GY
E6 — WHT-YEL
T2-2 — BRN
M1-2 — VIO
T5-3 — WHT-GY
XDS1-1 — WHT
J8-A — WHT-BLK-GRN
E5
CHASSIS

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06132 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019735	1016548
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130060
DRAWN J. MARGIOTTA DATE 12-5-63
CHECKED J. [illegible] 1-21-64
APPROVAL
APPROVAL [illegible] 1-24-64
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

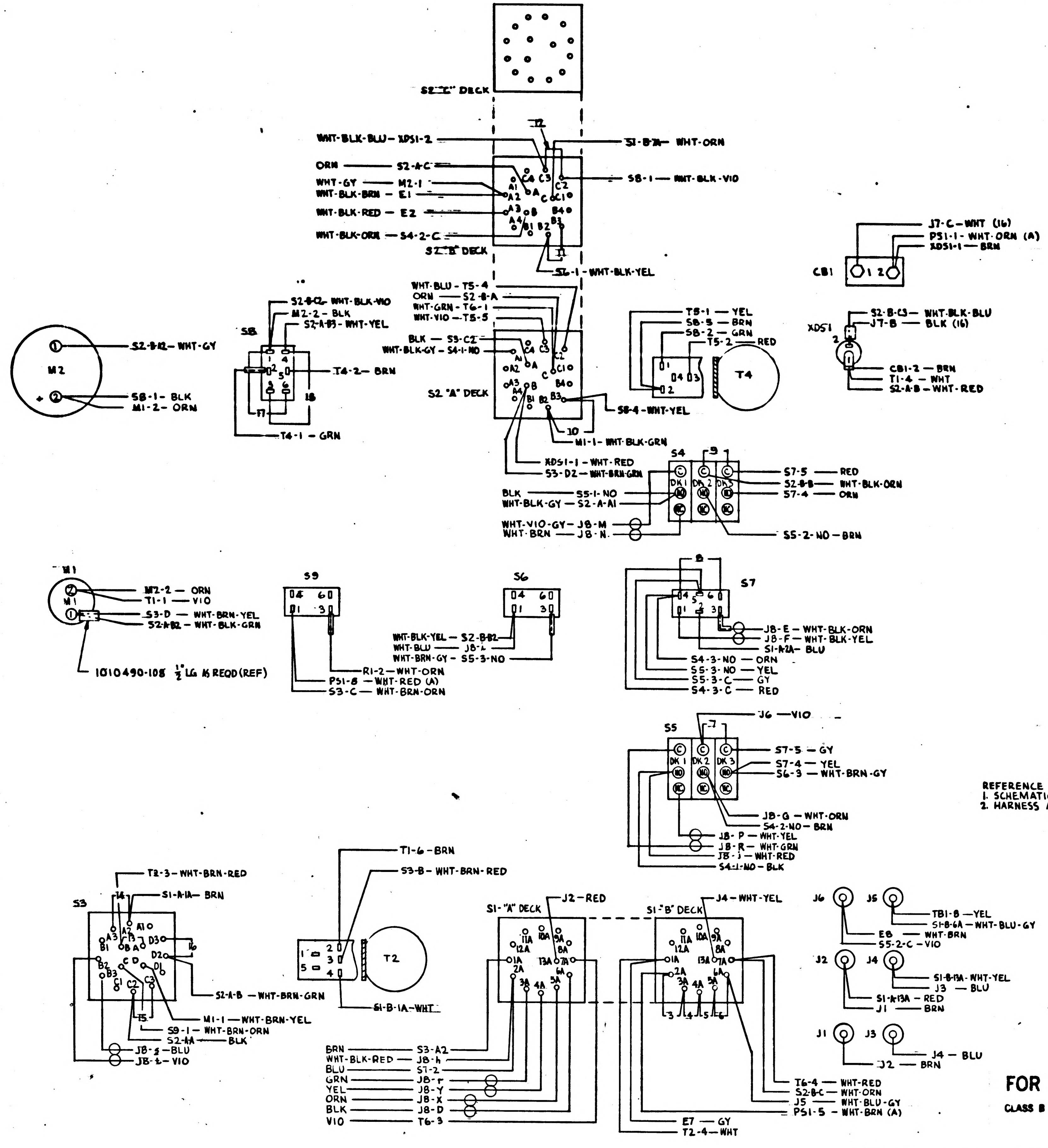
TITLE
CONTROL PANEL,
MAP & DATA VIEWER TESTER
WIRING DIAGRAM

CODE IDENT NO
SIZE E
NASA NUMBER 1019736
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019736

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SOLDER PER MSFC PROC-158A
3. WIRE PER ND 1002032
4. ALL WIRE TO BE AWG NO. 22 UNLESS OTHERWISE INDICATED


S2 "C" DECK
WHT-BLK-BLU – XDS1-2
ORN — S2-A-C
WHT-GY — M2-1
WHT-BLK-BRN – E1
WHT-BLK-RED – E2
WHT-BLK-ORN – S4-2-C
12
S1-B-7A – WHT-ORN
S8-1 — WHT-BLK-VIO
C4 C3 C2 C1 A1 A2 A3 A4 A B C B1 B2 B3 B4
S2 "B" DECK
11
S6-1 - WHT-BLK-YEL
WHT-BLU - T5-4
ORN — S2-B-A
WHT-GRN - T6-1
WHT-VIO — T5-5
BLK — S3-C2
WHT-BLK-GY – S4-1-NO
S2 "A" DECK
S8-4 - WHT-YEL
10
M1-1- WHT-BLK-GRN
XDS1-1 - WHT-RED
S3-D2 — WHT-BRN-GRN
M2
S2-B-A2 – WHT-GY
S8-1- BLK
M1-2- ORN
S8
S2-B-C2 WHT-BLK-VIO
M2-2 - BLK
S2-A-B3 - WHT-YEL
T4-2— BRN
T4-1 — GRN
17
18
T5-1 — YEL
S8-5 — BRN
S8-2 — GRN
T5-2 — RED
T4
CB1
J7-C – WHT (16)
PS1-1- WHT-ORN (A)
XDS1-1 — BRN
XDS1
S2-B-C3— WHT-BLK-BLU
J7-B — BLK (16)
CB1-2 — BRN
T1-4 – WHT
S2-A-B – WHT-RED
S4
9
DK 1 DK 2 DK 3
S7-5 — RED
S2-B-B— WHT-BLK-ORN
S7-4 — ORN
BLK — S5-1- NO
WHT-BLK-GY — S2-A-A1
WHT-VIO-GY – J8-M
WHT-BRN — J8-N.
S5-2-NO – BRN
M1
M2-2 — ORN
T1-1 — VIO
S3-D — WHT-BRN-YEL
S2-A-B2 – WHT-BLK-GRN
1010490-108 1/2" LG 16 REQD (REF)
S9
R1-2—WHT-ORN
PS1-8 —WHT-RED (A)
S3-C— WHT-BRN-ORN
S6
WHT-BLK-YEL – S2-B-B2
WHT-BLU — J8-L
WHT-BRN-GY – S5-3-NO
S7
8
J8-E – WHT-BLK-ORN
J8-F – WHT-BLK-YEL
S1-A-2A– BLU
S4-3-NO – ORN
S5-3-NO —YEL
S5-3-C— GY
S4-3-C — RED
S5
7
J6 —VIO
S7-5 — GY
S7-4 — YEL
S6-3 — WHT-BRN-GY
J8-G — WHT-ORN
S4-2-NO – BRN
J8-P — WHT-YEL
J8-R— WHT-GRN
J8-j — WHT-RED
S4-1-NO – BLK
S3
T2-3 – WHT-BRN-RED
14
S1-A-1A— BRN
13
16
15
S2-A-B —WHT-BRN-GRN
M1-1 —WHT-BRN-YEL
S9-1 – WHT-BRN-ORN
S2-A-A — BLK
J8-s —BLU
J8-t – VIO
T1-6 - BRN
S3-B – WHT-BRN-RED
T2
S1-B-1A–WHT
S1-"A" DECK
J2 – RED
S1-"B" DECK
J4 – WHT-YEL
BRN — S3-A2
WHT-BLK-RED — J8-h
BLU — S7-2
GRN — J8-r
YEL — J8-Y
ORN — J8-X
BLK — J8-D
VIO — T6-3
3 4 5 6
T6-4 — WHT-RED
S2-B-C — WHT-ORN
J5 — WHT-BLU-GY
PS1-5 - WHT-BRN (A)
E7 — GY
T2-4—WHT
J6 J5 J2 J4 J1 J3
TB1-8 —YEL
S1-B-6A – WHT-BLU-GY
E8 — WHT-BRN
S5-2-C – VIO
S1-B-13A - WHT-YEL
J3 — BLU
S1-A-13A – RED
J1 — BRN
J4 – BLU
J2 — BRN

FRONT PANEL

REFERENCE DRAWINGS:
1. SCHEMATIC DIAGRAM 1019742
2. HARNESS ASSY 1019739

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06132 DATE 2-4-64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019735	1016948

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130060
DRAWN L MARGIOTTA DATE 12-5-63
CHECKED J. AMERSON 1-21-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

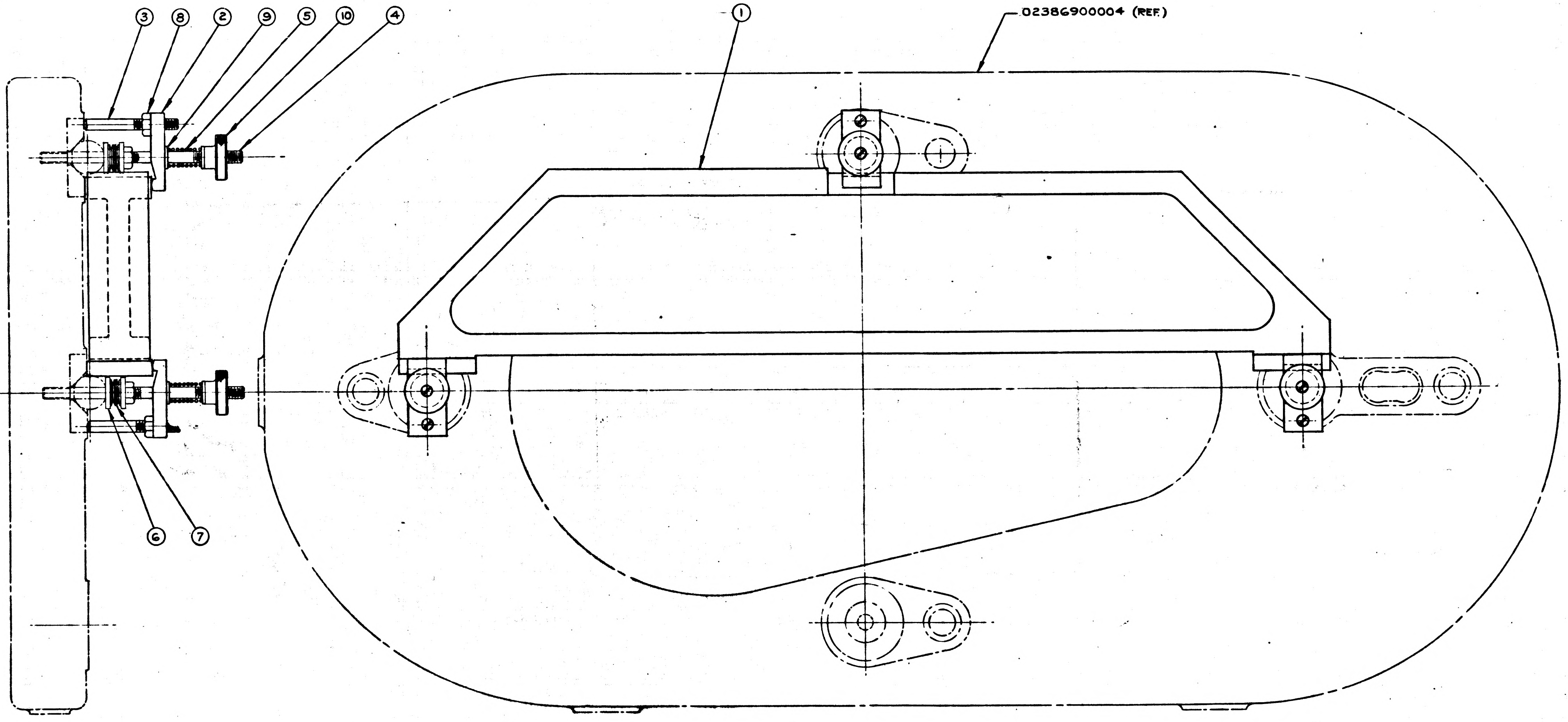
TITLE
CONTROL PANEL
MAP & DATA VIEWER TESTER
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019736
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019737

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 0T036 DATE 10 Dec 63

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	3		PENDING	74443043003		NUT, PLAIN, KNURLED			
9	6		AN960-C416	74468051006		WASHER, FLAT			
8	6		MS35690-410	61501051040		NUT, PLAIN, HEX			
7	12		1010408-006	74468040006		WASHER, SPRING TENSION			
6	6		1019135	03386900679		WASHER			
5	3		1019134	03386900678		SPRING			
4	3		1019133	03386900677		STUD, CLAMP			
3	3		1019132	03386900676		HEEL PIN			
2	3		1019118	03386900675		CLAMP			
1	1		1019744	02386900157		BAR, ASSEM			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900133

DRAWN E.H.S. DATE 11-15-63
CHECKED 11-15-63
APPROVAL
APPROVAL 11-15-63
NASA APPROVAL 12-9-63
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AZIMUTH CHECK BAR ASSY.

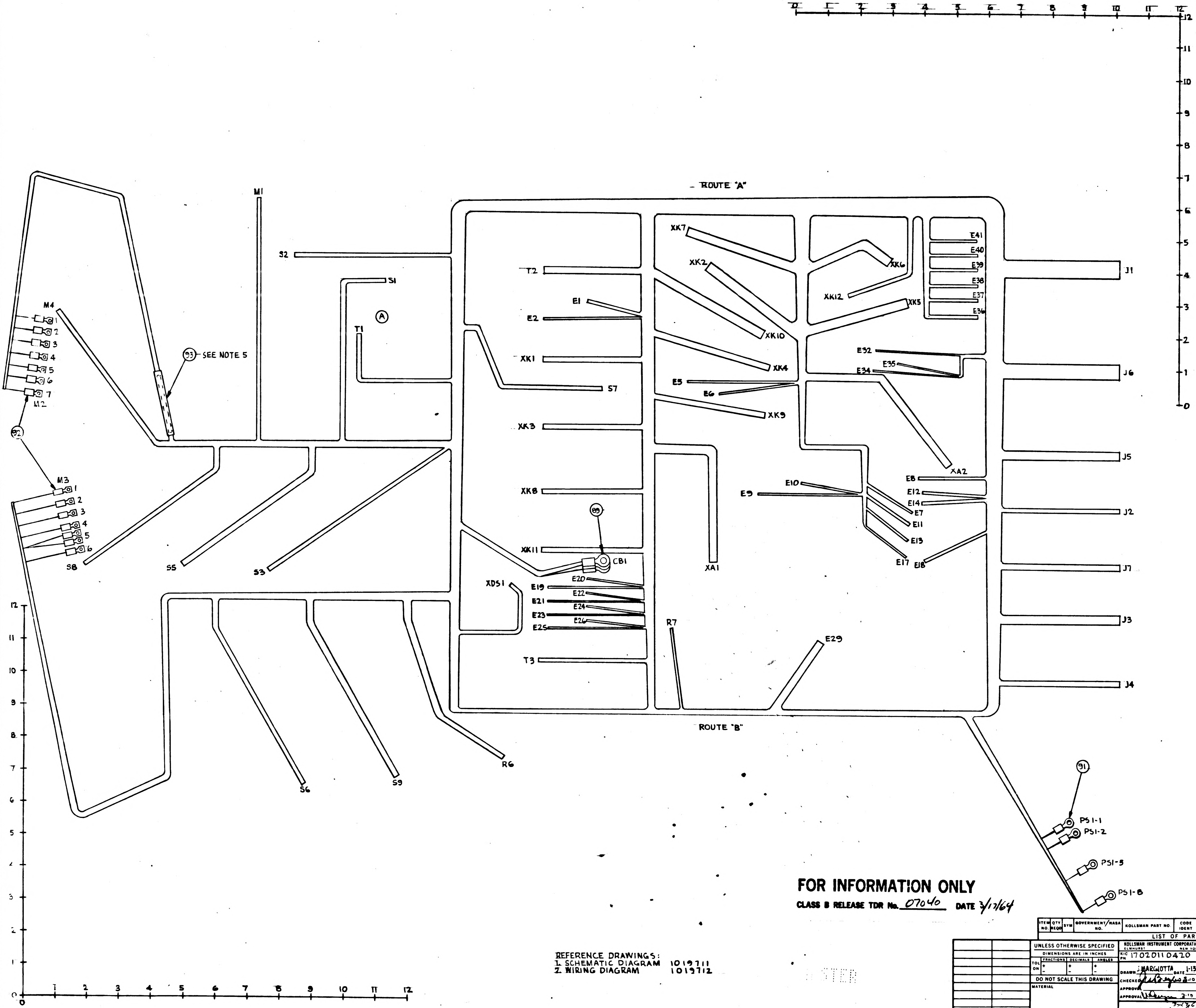
CODE IDENT NO.
SIZE E
NASA NUMBER 1019737
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

1019738 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		QTY OF ITEM 91 WAS 4 PT NO OF ITEM 9. WAS 1011753 COND NO. 186-ITEM W. WAS 100 ADDED NOTE 13. REROUTED T1 TDRR 10060 DATE 6-9-64	105002 J.M	EAS WK



ROUTE "A"
ROUTE "B"
M1
M4
M3
S1
S2
S3
S5
S6
S7
S8
S9
T1
T2
T3
Ⓐ
93 SEE NOTE 5
92
91
89
1
2
3
4
5
6
7
XK1
XK2
XK3
XK4
XK5
XK6
XK7
XK8
XK9
XK10
XK11
XK12
XA1
XA2
XDS1
CB1
R6
R7
E1
E2
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E17
E18
E19
E20
E21
E22
E23
E24
E25
E26
E29
E32
E34
E35
E36
E37
E38
E39
E40
E41
J1
J2
J3
J4
J5
J6
J7
PS1-1
PS1-2
PS1-5
PS1-8

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07040 DATE 3/17/64

REFERENCE DRAWINGS:
1. SCHEMATIC DIAGRAM 1019711
2. WIRING DIAGRAM 1019712

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1017389	1016949
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110420
DRAWN J.MARGIOTTA DATE 1-13-64
CHECKED 3-10-64
APPROVAL
APPROVAL 3-10-64
NASA APPROVAL 3-17-64
3/17/64
MIT APPROVAL 3/17/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING HARNESS, BRANCHED

CODE IDENT NO.
SIZE E
NASA NUMBER 1019738
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019738 A

1019738 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SEE SHEET 1 OF 2	4-1-64	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
3. WIRE TO CONFORM WITH ND 1002181 TYPE I, ~~CLASS 1~~ EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)
4. WIRE PER ND1002032
5. IDENTIFY USING NASA PART NO., REV LETTER, MFRS SYM PER ND 1002019.
6. WIRE TO CONFORM WITH ND 1002181 TYPE I CLASS 8 EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
7. WIRE TO CONFORM WITH ND 1002181 TYPE II, CLASS 8 EXCEPT FOR SECTION 4
8. HARNESS SHALL BE SPOT TIED APPROX 1/2" APART USING ITEM NO. 94. Ⓐ

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	75	GY	34	B	J4-B	CB1-1	
2	74	YEL	15		J4-D	E14	
3	73	WHT-BLK	14		J4-A	E18	
4	49	WHT-VIO-GY	12		J3-A	E18	
5	48	WHT-BLU-GY	13		B	E8	
6	11	WHT-BLU	13		N	E14	
7	47	WHT-BLU-VIO	24		C	E41	
8	46	WHT-GRN-GY	27		D	E36	
9	43	WHT-YEL-GY	25		G	E38	
10	5	WHT-BLK	38	A	E	E13	
11	6	WHT-BRN	38	A	H	E11	
12	7	WHT-RED	11		P	E12	
13	8	WHT-ORN	39	A	F	E17	
14	9	WHT-YEL	37	A	L	E7	
15	10	WHT-GRN	11		M	E14	
16	41	WHT-YEL-BLU	37	A	J	E7	
17	40	WHT-YEL-GRN	39	A	K	E17	
18	12	WHT-VIO	11		J3-R	E12	
19	49	WHT-VIO-GY	24	A	J7-A	XK12-7	
20	48	WHT-BLU-GY	24	A	J7-B	XK12-4	
21	1	BLK	20	B	J7-C	E29	
22	4	WHT	20	B	J7-D	E29	
23	47	WHT-BLU-VIO	24	A	J7-E	XK12-6	
24	46	WHT-GRN-GY	24	A	J7-F	XK12-3	
25	49	WHT-VIO-GY	21	A	J2-A	E39	
26	48	WHT-BLU-GY	22	A	J2-B	E36	
27	47	WHT-BLU-VIO	23	B	PS1-1	T3-3	
28	7	WHT-RED	23	B	PS1-2	T3-1	
29	49	WHT-VIO-GY	42	A	PS1-1	E11	
30	40	WHT-YEL-GRN	43	A	PS1-2	E13	
31	11	WHT-BLU	33	A	PS1-5	XK12-2	
32	30	WHT-RED-YEL	44	B	PS1-8	S6-A13	
33	49	WHT-VIO-GY	27	A	J5-B	XK5-19	
34	47	WHT-BLU-VIO	27	A	J5-C	XK5-13	
35	46	WHT-GRN-GY	27	A	J5-D	XK5-10	
36	48	WHT-BLU-GY	27	A	J5-E	XK5-16	
37	17	WHT-BLK-YEL	16	A	J6-A	E41	
38	18	WHT-BLK-GRN	17	A	B	E40	
39	24	WHT-BRN-YEL	28	A	E	XK10-19	
40	23	WHT-BRN-ORN	28	A	F	XK10-16	
41	22	WHT-BRN-RED	28	A	G	XK10-13	
42	20	WHT-BLK-VIO	28	A	H	XK10-7	
43	21	WHT-BLK-GY	28	A	c	XK10-10	
44	19	WHT-BLK-BLU	28	A	d	XK10-4	
45	13	WHT-GY	41	B	J	XA1-F	
46	39	WHT-ORN-GY	41	B	K	XA1-H	
47	81	BLK/BLK	24	A	N	XK2-5	SEE FIG 1
		BLK/WHT	24	A	P	XK2-8	SEE FIG. 1
48	25	WHT-BRN-GRN	28	A	R	XA2-M	
49	30	WHT-RED-YEL	33	B	S	E21	
50	31	WHT-RED-GRN	32	B	T	E22	
51	67	WHT-RED-BLU	37	B	U	XK11-14	
52	54	WHT-GRN	22	A	V	XK6-17	
53	9	WHT-YEL	22	A	W	XK6-11	
54	72	WHT-BLU-GY	22	A	X	XK6-14	
55	55	WHT-VIO	22	A	Y	XK6-20	
56	37	WHT-ORN-BLU	41	A	b	XA1-C	
57	82	BLK/VIO	24	A	e	XK2-11	SEE FIG.2
		BLK/GY	24	A	f	XK2-4	SEE FIG. 2
58	28	WHT-BRN-GY	33	B	g	E20	
59	47	WHT-BLU-VIO	37	B	h	XK11-8	
60	27	WHT-BRN-VIO	34	B	i	E19	
61	51	WHT-BRN	24	A	j	XK5-17	
62	50	WHT-BLK	24	A	k	XK5-11	
63	52	WHT-RED	24	A	m	XK5-14	
64	53	WHT-ORN	24	A	n	XK5-20	
65	15	WHT-BLK-RED	48	B	r	S3-A3	
66	16	WHT-BLK-ORN	31	B	s	T3-5	
67	26	WHT-BRN-BLU	26	B	J6-t	E29	
68	32	WHT-RED-BLU	28	A	E34	XA2-K	
69	16	WHT-BLK-ORN	29	A	E34	XK10-8	
70	33	WHT-RED-VIO	27	A	E35	XA2-R	
71	36	WHT-ORN-YEL	27	A	E32	XA2-P	
72	29	WHT-RED-ORN	27	A	J1-A	XK1-10	
73	30	WHT-RED-YEL	27	A	B	XK1-7	
74	31	WHT-RED-GRN	27	A	C	XK1-4	
75	33	WHT-RED-VIO	13		D	E41	
76	32	WHT-RED-BLU	14		E	E40	
77	46	WHT-GRN-GY	15		J	E38	
78	47	WHT-BLU-VIO	17		K	E36	
79	43	WHT-YEL-GY	51	B	L	S3-A1	
80	42	WHT-YEL-VIO	33	B	M	R7-1	
81	24	WHT-BRN-YEL	31	B	R	E29	
82	1	BLK	24	A	S	XA2-M	
83	10	WHT-GRN	31	A	T	XA1-S	
84	41	WHT-YEL-BLU	19	A	Y	XK7-15	
85	40	WHT-YEL-GRN	19	A	Z	XK7-9	
86	38	WHT-ORN-VIO	19	A	a	XK7-6	
87	39	WHT-ORN-GY	19	A	b	XK7-12	
88	14	WHT-BLK-BRN	33	A	c	XK11-9	
89	15	WHT-BLK-RED	33	A	d	XK11-12	
90	58	WHT-BLK-ORN	20	A	e	XK6-20	
91	59	WHT-BLK-YEL	20	A	f	XK6-14	
92	61	WHT-BLK-BLU	20	A	g	XK6-11	
93	60	WHT-BLK-GRN	20	A	h	XK6-17	
94	26	WHT-BRN-BLU	27	A	i	XK1-19	
95	28	WHT-BRN-GY	27	A	j	XK1-13	
96	27	WHT-BRN-VIO	27	A	p	XK1-16	
97	83	BLK/RED	21	A	k	XK2-3	SEE FIG. 1
		BLK/BRN	21	A	m	XK2-6	SEE FIG. 1
98	36	WHT-ORN-GRN	20	A	n	XK7-11	
99	37	WHT-ORN-BLU	20	A	p	XK7-17	
100	35	WHT-ORN-YEL	20	A	q	XK7-14	
101	34	WHT-RED-GY	20	A	r	XK7-8	
102	45	WHT-GRN-VIO	15		s	E37	
103	3	GRN	14		GG	E39	
104	80	BLK/YEL	21	A	u	XK2-9	SEE FIG. 2
		BLK/ORN	21	A	v	XK2-12	SEE FIG. 2
105	62	WHT-BLK-VIO	21	A	w	XK5-20	
106	63	WHT-BLK-GY	21	A	x	XK5-14	
107	65	WHT-BRN-ORN	21	A	y	XK5-11	
108	64	WHT-BRN-RED	21	A	z	XK5-17	
109	13	WHT-GY	39	B	AA	XK11-6	
110	12	WHT-VIO	36	B	BB	E24	
111	11	WHT-BLU	36	B	HH	E23	
112	48	WHT-BLU-GY	15	A	CC	E38	
113	49	WHT-VIO-GY	17	A	J1-DD	E36	
114	56	WHT-BLK-BRN	63	A	E37	M3-5	
115	13	WHT-GY	20	A	E37	XA2-F	
116	12	WHT-VIO	19		E39	XA2-H	
117	1	BLK	19	A	E40	T2-3	
118	7	WHT-RED	21	A	E40	XK4-5	
119	7	WHT-RED	38	A	XK12-1	S5-C7	
120	8	WHT-ORN	16	A	XK12-2	XK6-2	
122	5	WHT-BLK	39	A	XK12-5	S5-B13	
123	6	WHT-BRN	39	A	XK12-8	S5-A13	

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
124	26	WHT-BRN-BLU	43	A	XK6-1	S6-A3	
125	28	WHT-BRN-GY	12		2	XK5-2	
126	25	WHT-BRN-GRN	10		9	XK7-7	
127	11	WHT-BLU	12		10	XK5-9	
128	56	WHT-BLK-BRN	50	A	11	M2-1	
129	57	WHT-BLK-RED	51	A	17	M2-2	
130	24	WHT-BRN-YEL	10		12	XK7-10	
131	36	WHT-ORN-GRN	12		13	XK5-12	
132	50	WHT-BLK	52	A	14	M2-3	
133	62	WHT-BLK-VIO	53	A	20	M2-4	
134	23	WHT-BRN-ORN	10		15	XK7-13	
135	37	WHT-ORN-BLU	12		16	XK5-15	
136	22	WHT-BRN-RED	10		18	XK7-16	
137	35	WHT-ORN-YEL	12		XK6-19	XK5-18	
138	5	WHT-BLK	45	A	XK7-1	S6-A2	
139	17	WHT-BLK-YEL	13		2	XK2-2	
140	31	WHT-RED-GRN	19	A	2	XK10-2	
141	11	WHT-BLU	36	A	9	S5-B2	
142	10	WHT-GRN	36	A	15	S5-A2	
143	12	WHT-VIO	36	A	17	S5-A4	
144	13	WHT-GY	36	A	XK7-11	S5-B4	
145	42	WHT-YEL-VIO	46	A	XK5-1	S6-A4	
146	43	WHT-YEL-GY	10		2	XK2-2	
147	68	WHT-ORN-VIO	60	A	11	M3-1	
148	69	WHT-ORN-GY	61	A	17	M3-2	
149	70	WHT-YEL-GRN	62	A	14	M3-3	
150	71	WHT-YEL-BLU	63	A	XK5-20	M3-4	
151	46	WHT-GRN-GY	41	A	XK2-1	S8-A3	
152	11	WHT-BLU	20	A	XK2-1	XK10-1	
156	53	WHT-ORN	3		SHLD COND 47	SHLD COND 97	SEE FIG. 1
157	52	WHT-RED	3		SHLD COND 47	XK2-7	SEE FIG. 1
158	51	WHT-BRN	3		SHLD COND 57	SHLD COND 104	SEE FIG. 2
159	65	WHT-BRN-ORN	3		SHLD COND 57	XK2-13	SEE FIG. 2
160	78	BLK/GRN	14		XK2-4	XA2-B	
161	70	WHT-YEL-GRN	14		7	XA2-C	
162	66	WHT-RED-ORN	28	A	7	XK11-10	
163	79	BLK/WHT-BLK	14	A	10	XA1-B	
164	71	WHT-YEL-BLU	14	A	13	XA1-C	
165	64	WHT-BRN-RED	28	A	XK2-13	XK11-4	
166	7	WHT-RED	31	A	XA2-A	XA1-A	
167	41	WHT-YEL-BLU	40		A	E29	
168	24	WHT-BRN-YEL	31	A	R	XA1-R	
169	23	WHT-BRN-ORN	31	A	P	XA1-P	
170	8	WHT-ORN	31	A	F	XA1-F	
171	11	WHT-BLU	31	A	H	XA1-H	
172	38	WHT-ORN-VIO	18		J	E9	
173	14	WHT-BLK-BRN	31		K	XA1-K	
174	9	WHT-YEL	40		XA2-P	E29	
175	51	WHT-BRN	3		SHLD COND 160	SHLD COND 177	SEE FIG 4
176	50	WHT-BLK	3		SHLD COND 160	XA2-S	SEE FIG. 4
177	76	BLK/RED	48		XA2-B	S9-A4	SEE FIG. 4
178	43	WHT-YEL-GY	33		XA2-N	XK11-13	
179	15	WHT-BLK-RED	23	A	E5	XK10-5	
180	14	WHT-BLK-BRN	21	A	E6	XK10-11	
181	35	WHT-ORN-YEL	28	A	E5	XA1-J	
182	34	WHT-RED-GY	27		E6	XA1-D	
183	45	WHT-GRN-VIO	21	B	E12	E29	
184	37	WHT-ORN-BLU	16		E10	XA2-D	
185	98	BLU	14	B	E29	T3-5	
186	5	WHT-BLK	20	B	E29	XK8-12	
187	6	WHT-BRN	30	B	E29	S9-B5	
188	7	WHT-RED	30	B	E29	S9-B4	
189	10	WHT-GRN	18		E29	XK11-2	
190	5	WHT-BLK	24		R7-2	R6-3	
191	10	WHT-GRN	12		R7-1	T3-5	
192	33	WHT-RED-VIO	18		XK10-1	XK11-1	
193	17	WHT-BLK-YEL	14		2	XK4-2	
194	5	WHT-BLK	15		3	XK9-4	
195	34	WHT-RED-GY	13		5	XK1-5	
196	6	WHT-BRN	15		6	XK9-7	
197	8	WHT-ORN	14		12	XK4-4	
198	42	WHT-YEL-VIO	13		14	XK1-14	
199	13	WHT-GY	29	A	14	E9	
200	9	WHT-YEL	14		15	XK4-7	
201	2	ORN	13		17	XK1-17	
202	10	WHT-GRN	14		18	XK4-10	
203	1	BLK	13		20	XK1-20	
204	12	WHT-VIO	28	A	XK10-20	E10	
205	5	WHT-BLK	27	A	T2-1	T1-2	
206	6	WHT-BRN	27	A	-2	T1-3	
207	7	WHT-RED	34	A	3	M1-1	
208	8	WHT-ORN	20	A	5	S2-A1	
209	9	WHT-YEL	20	A	T2-6	S2-A2	
210	14	WHT-BLK-BRN	22		E1	S2-B1	
211	15	WHT-BLK-RED	21		E2	S2-B2	
212	43	WHT-YEL-GY	25		XK4-1	S7-A4	
213	46	WHT-GRN-GY	11		2	XK1-2	
214	12	WHT-VIO	14		3	XK9-9	
215	44	WHT-GRN-BLU	14		5	XK9-5	
216	3	GRN	14		11	XK9-11	
217	13	WHT-GY	24		XK4-11	S2-A7	
218	41	WHT-YEL-BLU	37	A	XK1-1	S8-A1	
219	45	WHT-GRN-VIO	11		2	XK9-2	
220	40	WHT-YEL-GRN	13		3	XK8-19	
221	39	WHT-ORN-GY	13		6	XK8-16	
222	38	WHT-ORN-VIO	13		9	XK8-13	
223	35	WHT-ORN-YEL	11		12	XK3-19	
224	15	WHT-BLK-RED	11		15	XK3-16	
225	14	WHT-BLK-BRN	11		XK1-18	XK3-13	
226	9	WHT-YEL	27	A	XK9-1	S7-A5	
227	46	WHT-BLU-GY	11		2	XK3-2	
228	38	WHT-ORN-VIO	11		3	XK3-18	
229	10	WHT-GRN	11		5	XK3-20	
230	36	WHT-ORN-GRN	11		XK9-11	XK3-14	
231	17	WHT-BLK-YEL	39	B	XK3-1	S7-A2	
232	49	WHT-VIO-GY	11		XK3-2	XK8-2	
233	43	WHT-YEL-GY	11		XK3-12	XK8-18	
234	18	WHT-BLK-GRN	11		XK3-20	XK8-20	
235	77	BLK/BLK	37	B	XA1-B	S9-A5	SEE FIG. 3
236	65	WHT-BRN-ORN	3		SHLD COND 163	SHLD COND 235	SEE FIG. 3
237	64	WHT-BRN-RED	3		SHLD COND 163	XA1-S	SEE FIG. 3
238	3	GRN	15		XA1-N	XK11-7	
239	20	WHT-BLK-VIO	37	B	XK8-1	S7-A3	
240	48	WHT-BLU-GY	11		XK8-2	XK11-2	
241	47	WHT-BLU-VIO	37	B	XK8-20	S1-1	
242	38	WHT-ORN-VIO	36	B	XK11-3	S5-A5	
243	24	WHT-ORN-BLU	36	B	6	S5-B5	
244	23	WHT-ORN-YEL	36	B	12	S5-B3	
245	36	WHT-ORN-GRN	36	B	9	S5-A3	
246	39	WHT-ORN-GY	36	B	5	S5-A7	
247	40	WHT-YEL-GRN	36	B	8	S5-B7	
248	41	WHT-YEL-BLU	36	B	11	S5-A6	
249	42	WHT-YEL-VIO	36	B	14	S5-B6	
250	23	WHT-BRN-ORN	32		4	S9-B3	
251	6	WHT-BRN	10		11	E22	
252	7	WHT-RED	9		5	E20	
253	5	WHT-BLK	10		XK11-3	E24	

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
254	24	WHT-BRN-YEL	32		XK11-10	S9-B2	
255	6	WHT-BRN	20	B	T3-1	XDS1-2	
256	14	WHT-BLK-BRN	24	B	T3-3	CB1-2	
257	8	WHT-ORN	25	B	T3-6	R6-1	
258	13	WHT-GY	25	B	E25	R6-2	
259	5	WHT-BLK	29	B	E26	S3-A13	
260	5	WHT-BLK	27	B	S2-B1	M1-2	
261	4	WHT	21		S7-A13	S5-C13	
262	7	WHT-RED	15		T1-1	S1-2	
263	14	WHT-BLK-BRN	15		T1-2	S1-5	
264	53	WHT-ORN	32		S1-1	M2-6	
265	96	WHT-YEL	31		S1-4	M2-5	
266	97	WHT-BLU	46		S1-4	M3-5	
267	30	WHT-RED-ORN	29		S5-A1	S9-B13	
268	34	WHT-RED-GY	29		S5-B1	S9-A13	
269	31	WHT-RED-GRN	29		S5-C2	S9-C5	
270	49	WHT-VIO-GY	18		S5-C13	S8-A13	
271	48	WHT-BLU-GY	31		S8-A13	S9-C13	
272	5	WHT-BLK	31		S8-B3	M4-1	
273	9	WHT-YEL	25		S8-B13	XDS1-1	
274	51	WHT-BRN	60		M2-7	M3-6	
275	8	WHT-ORN	27		M4-2	XDS1-2	
276	5	WHT-BLK	15		CB1-2	XDS1-1	
277	41	WHT-YEL-BLU	20		S9-C13	S6-A13	
278	4	WHT	24		J3-U	E39	
279	43	WHT-YEL-GY	13		XK10-11	XK1-11	
280	7	WHT-RED	14		XK10-9	XK9-10	
281	5	WHT-BLK	25	A	XK1-8	S7-A13	
282	71	WHT-YEL-BLU	11		XK3-14	XK8-14	

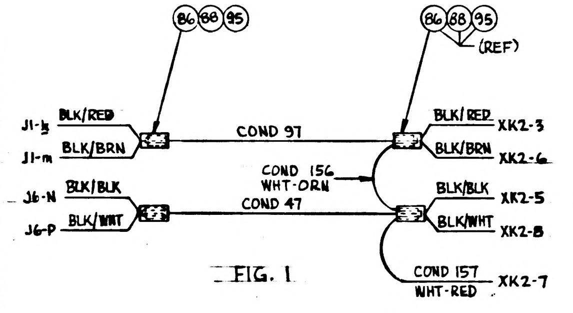


FIG. 1

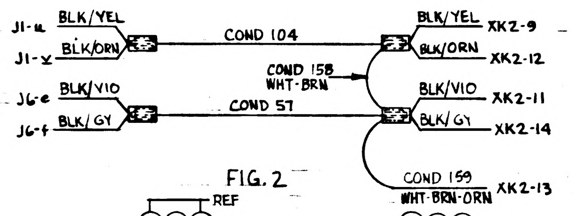


FIG. 2

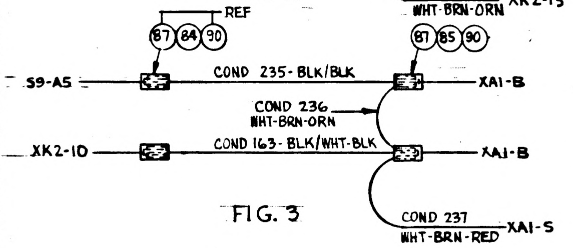


FIG. 3

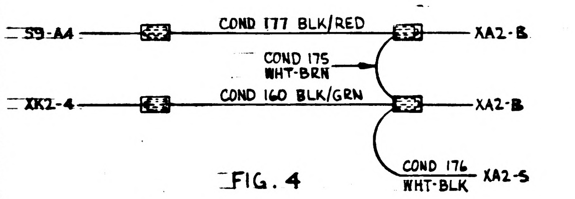


FIG. 4

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07040 DATE 3/17/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
98	14"		SEE NOTE 3			WIRE, ELECTRICAL (BLU)		(AWG 20)	
97	46"		SEE NOTE 3			WIRE, ELECTRICAL (WHT-BLU)		(AWG 22)	
96	31"		SEE NOTE 3			WIRE, ELECTRICAL (WHT-YEL)		(AWG 22	
95	8		1010490-136	6002503500?		INSULATION, SLEEVING (5/8" LG)			
94	AR		1001670-2	6003503 7002		TAPE, LACING & TYING			
93	1		1015865-464	60025035054		INSULATION SLEEVING (2" LG)			
92	14		MS17182-2	68 10101 6801		TERMINAL, INSULATED			
Ⓐ 91	6		MS25036-1	68 10000 3407		TERMINAL, INSULATED			
90	8		1010490-138	60 02503 5008		INSULATION SLEEVING (5/8" LG)			
89	3		MS25036-3	68 10000 3410		TERMINAL, INSULATED			
88	8		1000243-12	74 09404 5027		FERRULE (INNER)			
87	8		1000243-5	74 09404 5021		FERRULE (INNER)			
86	8		1000242-14	74 09404 5007		FERRULE (OUTER)			
85	4		1000242-8	74 09404 5003		FERRULE (OUTER)			
84	4		1000242-5	74 09404 5002		FERRULE (OUTER)			
83	21"		SEE NOTE 7			CABLE, ELECTRICAL (BLK/BRN, RED)		(AWG 20)	
82	24"					(BLK/VIO, GY)			
81	24"					(BLK/BLK, WHT)			
80	11"					(BLK/YEL, ORN)			
79	14"		SEE NOTE 7			(BLK/WHT-BLK)			
78	14"		SEE NOTE 7			(BLK/GRN)			
77	21"		SEE NOTE 6			(BLK/BLU)			
76	48"		SEE NOTE 6			CABLE ELECTRICAL (BLK/RED)		(AWG 20)	
75	34"		SEE NOTE 3			WIRE, ELECTRICAL (GY)		(AWG 16)	
74	15"					(YEL)		(AWG 16)	
73	14"					(WHT-BLK		(AWG 16)	
72	22"					(WHT-BLU-GY)		(AWG 22)	
71	88"					(YEL-BLU)			
70	76"					(YEL-GRN)			
69	61"					(ORN-GY)			
68	60"					(ORN-VIO)			
67	37"					(RED-BLU)			
66	20"					(RED-ORN)			
65	27"					(BRN-ORN)			
64	52"					(BRN-RED)			
63	21"					(BLK-GY)			
62	74"					(VIO)			
61	20"					(BLU)			
60	20"					(GRN)			
59	20"					(YEL)			
58	20"					(ORN)			
57	51"					(RED)			
56	113"					(BLK-BRN)			
55	22"					(VIO)			
54	22"					(GRN)			
53	59"					(ORN)			
52	27"					(RED)			
51	87"					(BRN)			
50	79"					(BLK)		(AWG 22)	
49	172"					(VIO-GY)		(AWG 20)	
48	179"					(BLU-GY)			
47	189"					(BLU-VIO)			
46	156"					(GRN-GY)			
45	47"					(GRN-VIO)			
44	[illegible]					(GRN-BLU)			
43	166"					(YEL-GY)			
42	128"					(YEL-VIO)			
41	189"					(YEL-BLU)			
40	150"					(YEL-GRN)			
39	109"					(ORN-GY)			
38	61"					(VIO)			
37	89"					(BLU)			
36	106"					(GRN)			
35	71"					(ORN-YEL)			
34	80"					(RED-GY)			
33	58"					(VIO)			
32	42"					(BLU)			
31	107"					(GRN)			
30	133"					(YEL)			
29	27"					(RED-ORN)			
28	72"					(BRN-GY)			
27	61"					(VIO)			
26	96"					(BLU)			
25	38"					(GRN)			
24	168"					(YEL)			
23	137"					(ORN)			
22	38"					(BRN-RED)			
21	28"					(BLK-GY)			
20	65"					(VIO)			
19	28"					(BLU)			
18	28"					(GRN)			
17	82"					(YEL)			
16	60"					(ORN)			
15	136"					(RED)			
14	156"					(BLK-BRN)			
13	203"					(GY)			
12	144"					(VIO)			
11	181"					(BLU)			
10	133"					(GRN)			
9	165"					(YEL)			
8	172"					(ORN)			
7	212"					(RED)			
6	179"					(BRN)			
5	345"					(BLK)			
4	65"					(WHT)			
3	43"					(GRN)			
2	13"					(ORN)			
1	76"		SEE NOTE 3			WIRE ELECTRICAL (BLK)		(AWG 20)	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020110420
DRAWN L. MARGIOTTA DATE 1-13-64
CHECKED 3/6/64
APPROVAL
APPROVAL 3-4-64
NASA APPROVAL 3-17-64
3/17/64
MIT APPROVAL 17 Mar 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

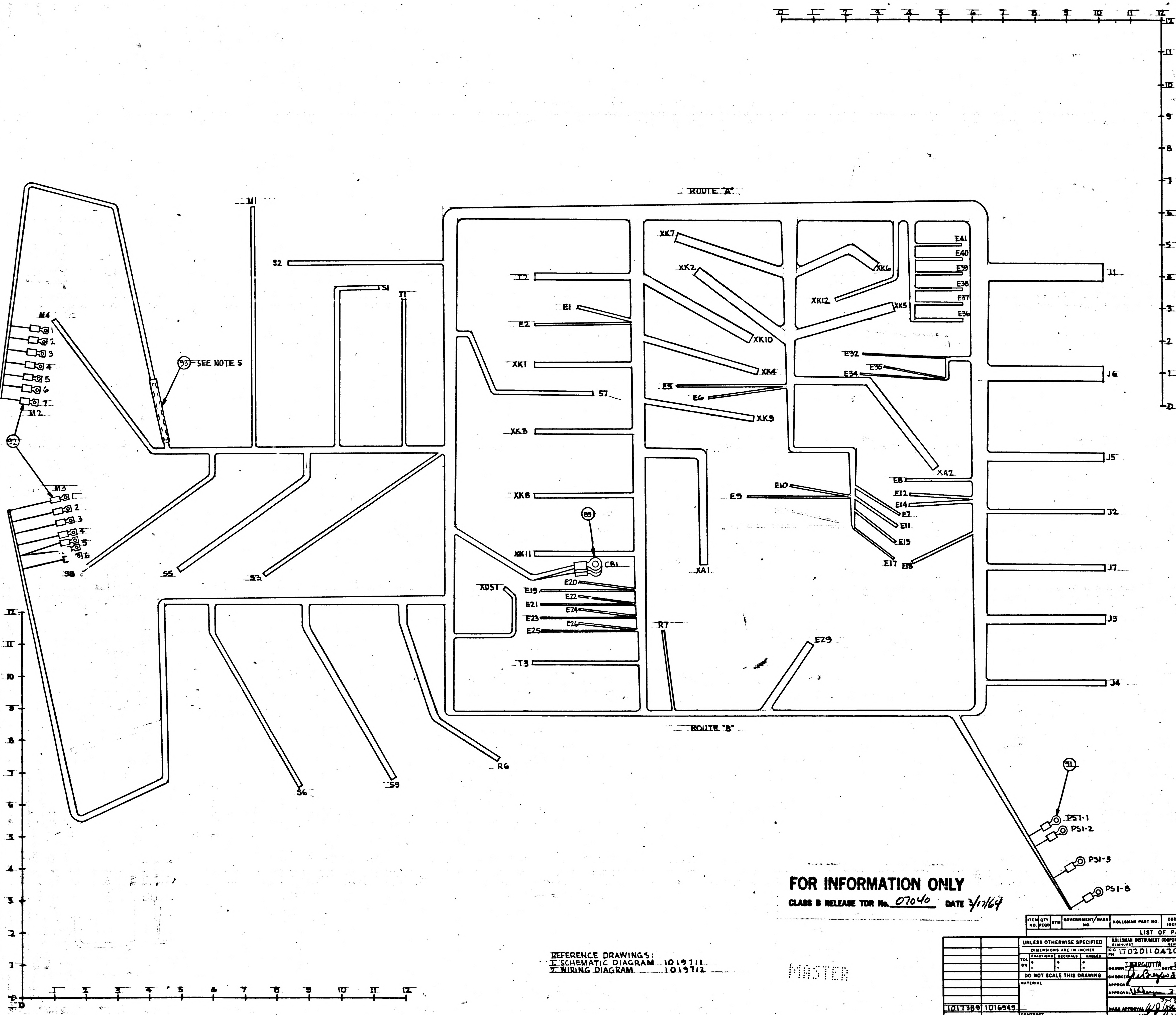
TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING HARNESS, BRANCHED

CODE IDENT NO. | SIZE E | NASA NUMBER 1019738
SCALE 1:1 | WEIGHT | CALC ACTUAL | SHEET 2 OF 2

1019738

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS


ROUTE "A"
ROUTE "B"
M1
S2
S1
I1
M4
1
2
3
4
5
6
7
M2
93
SEE NOTE 5
92
M3
2
3
4
5
6
S8
S5
S3
T2
E1
E2
XK1
S7
XK3
XK8
89
XK11
CB1
XDS1
E19
E20
E21
E22
E23
E24
E25
E26
T3
XK7
XK2
XK10
XK4
E5
E6
XK9
XA1
R7
E29
XK12
XK6
XK5
E41
E40
E39
E38
E37
E36
E32
E35
E34
XA2
E8
E9
E10
E12
E14
E7
E11
E13
E17
E18
J1
J6
J5
J2
J7
J3
J4
R6
S6
S9
91
PS1-1
PS1-2
PS1-5
PS1-8

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07040 DATE 3/17/64

REFERENCE DRAWINGS:
1. SCHEMATIC DIAGRAM 1019711
2. WIRING DIAGRAM 1019712

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 1702011D420
DRAWN I. MARGIOTTA DATE 1-13-64
CHECKED 3-10-64
APPROVAL
APPROVAL 3-10-64
NASA APPROVAL W.J. 3-24-64 3/17/64
MIT APPROVAL 17 Mar 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING HARNESS, BRANCHED

CODE IDENT NO.
SIZE E
NASA NUMBER 1019738
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019738

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
3. WIRE TO CONFORM WITH ND 1002181 TYPE I, CLASS I EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)
4. WIRE PER ND 1002032
5. IDENTIFY USING NASA PART NO., REV LETTER, MFRS SYM PER ND 1002019.
6. WIRE TO CONFORM WITH ND 1002181 TYPE I CLASS B EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
7. WIRE TO CONFORM WITH ND 1002181 TYPE II, CLASS B EXCEPT FOR SECTION 4

	CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
	NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
	1	15	GY	34	B	J4-B	CB1-1	
	2	74	YEL	15		J4-D	E14	
	3	73	WHT-BLK	14		J4-A	E18	
TW	4	49	WHT-VIO-GY	12		J3-A	E18	
	5	48	WHT-BLU-GY	13		B	E8	
	6	11	WHT-BLU	13		N	E14	
TW	7	47	WHT-BLU-VIO	24		C	E41	
	8	46	WHT-GRN-GY	27		D	E36	
	9	43	WHT-YEL-GY	25		G	E38	
TW	10	5	WHT-BLK	38	A	E	E13	
	11	6	WHT-BRN	38	A	H	E11	
	12	7	WHT-RED	11		P	E12	
TW	13	8	WHT-ORN	39	A	F	E17	
	14	9	WHT-YEL	37	A	L	E7	
	15	10	WHT-GRN	11		M	E14	
TW	16	41	WHT-YEL-BLU	37	A	J	E7	
	17	40	WHT-YEL-GRN	39	A	K	E17	
	18	12	WHT-VIO	11		J3-R	E12	
TW	19	49	WHT-VIO-GY	24	A	J7-A	XK12-7	
	20	48	WHT-BLU-GY	24	A	J7-B	XK12-4	
	21	1	BLK	20	B	J7-C	E29	
	22	4	WHT	20	B	J7-D	E29	
TW	23	47	WHT-BLU-VIO	24	A	J7-E	XK12-6	
	24	46	WHT-GRN-GY	24	A	J7-F	XK12-3	
	25	49	WHT-VIO-GY	21	A	J2-A	E39	
	26	48	WHT-BLU-GY	22	A	J2-B	E36	
TW	27	47	WHT-BLU-VIO	23	B	PS1-1	T3-3	
	28	7	WHT-RED	23	B	PS1-2	T3-1	
TW	29	49	WHT-VIO-GY	42	A	PS1-1	E11	
	30	40	WHT-YEL-GRN	43	A	PS1-2	E13	
	31	11	WHT-BLU	33	A	PS1-5	XK12-2	
	32	30	WHT-RED-YEL	44	B	PS1-8	S6-A13	
	33	49	WHT-VIO-GY	27	A	J5-B	XK5-19	
	34	47	WHT-BLU-VIO	27	A	J5-C	XK5-13	
	35	46	WHT-GRN-GY	27	A	J5-D	XK5-10	
	36	48	WHT-BLU-GY	27	A	J5-E	XK5-16	
TW	37	17	WHT-BLK-YEL	16	A	J6-A	E41	
	38	18	WHT-BLK-GRN	17	A	B	E40	
TW	39	24	WHT-BRN-YEL	28	A	E	XK10-19	
	40	23	WHT-BRN-ORN	28	A	F	XK10-16	
	41	22	WHT-BRN-RED	28	A	G	XK10-13	
TW	42	20	WHT-BLK-VIO	23	A	H	XK10-7	
	43	21	WHT-BLK-GY	28	A	c	XK10-10	
	44	19	WHT-BLK-BLU	28	A	d	XK10-4	
TW	45	13	WHT-GY	41	B	J	XA1-F	
	46	39	WHT-ORN-GY	41	B	K	XA1-H	
	47	81	BLK/BLK BLK/WHT	24 24	A A	N P	XK2-5 XK2-8	SEE FIG. 1 SEE FIG. 1
	48	25	WHT-BRN-GRN	28	A	R	XA2-M	
TW	49	30	WHT-RED-YEL	33	B	S	E21	
	50	31	WHT-RED-GRN	32	B	T	E22	
	51	67	WHT-RED-BLU	37	B	U	XK11-14	
TW	52	54	WHT-GRN	22	A	V	XK6-17	
	53	9	WHT-YEL	22	A	W	XK6-11	
TW	54	72	WHT-BLU-GY	22	A	X	XK6-14	
	55	55	WHT-VIO	22	A	Y	XK6-20	
	56	37	WHT-ORN-BLU	41	A	b	XA1-C	
	57	82	BLK/VIO BLK/GY	24 24	A A	e f	XK2-11 XK2-14	SEE FIG. 2 SEE FIG. 2
TW	58	28	WHT-BRN-GY	33	B	g	E20	
	59	47	WHT-BLU-VIO	37	B	h	XK11-8	
	60	27	WHT-BRN-VIO	34	B	i	E19	
TW	61	51	WHT-BRN	24	A	j	XK5-17	
	62	50	WHT-BLK	24	A	k	XK5-11	
TW	63	52	WHT-RED	24	A	m	XK5-14	
	64	53	WHT-ORN	24	A	n	XK5-20	
TW	65	15	WHT-BLK-RED	48	B	r	S3-A3	
	66	16	WHT-BLK-ORN	31	B	s	T3-5	
	67	26	WHT-BRN-BLU	26	B	J6-t	E29	
	68	32	WHT-RED-BLU	28	A	E34	XA2-K	
	69	16	WHT-BLK-ORN	29	A	E34	XK10-8	
	70	33	WHT-RED-VIO	27	A	E35	XA2-R	
	71	36	WHT-ORN-YEL	27	A	E32	XA2-P	
TW	72	29	WHT-RED-ORN	27	A	J1-A	XK1-10	
	73	30	WHT-RED-YEL	27	A	B	XK1-7	
	74	31	WHT-RED-GRN	27	A	C	XK1-4	
TW	75	33	WHT-RED-VIO	13		D	E41	
	76	32	WHT-RED-BLU	14		E	E40	
TW	77	46	WHT-GRN-GY	15		J	E38	
	78	47	WHT-BLU-VIO	17		K	E36	
TW	79	43	WHT-YEL-GY	51	B	L	S3-A1	
	80	42	WHT-YEL-VIO	33	B	M	R7-1	
	81	24	WHT-BRN-YEL	31	B	R	E29	
	82	1	BLK	24	A	S	XA2-M	
	83	10	WHT-GRN	31	A	T	XA1-S	
TW	84	41	WHT-YEL-BLU	19	A	Y	XK7-15	
	85	40	WHT-YEL-GRN	19	A	Z	XK7-9	
TW	86	38	WHT-ORN-VIO	19	A	a	XK7-6	
	87	39	WHT-ORN-GY	19	A	b	XK7-12	
TW	88	14	WHT-BLK-BRN	33	A	c	XK11-9	
	89	15	WHT-BLK-RED	33	A	d	XK11-12	
TW	90	58	WHT-BLK-ORN	20	A	e	XK6-20	
	91	59	WHT-BLK-YEL	20	A	f	XK6-14	
TW	92	61	WHT-BLK-BLU	20	A	g	XK6-11	
	93	60	WHT-BLK-GRN	20	A	h	XK6-17	
TW	94	26	WHT-BRN-BLU	27	A	i	XK1-19	
	95	28	WHT-BRN-GY	27	A	j	XK1-13	
	96	27	WHT-BRN-VIO	27	A	p	XK1-16	
	97	83	BLK/RED BLK/BRN	21 21	A A	k m	XK2-3 XK2-6	SEE FIG. 1 SEE FIG. 1
TW	98	36	WHT-ORN-GRN	20	A	n	XK7-11	
	99	37	WHT-ORN-BLU	20	A	p	XK7-17	
TW	100	35	WHT-ORN-YEL	20	A	q	XK7-14	
	101	34	WHT-RED-GY	20	A	r	XK7-8	
TW	102	45	WHT-GRN-VIO	15		s	E37	
	103	3	GRN	14		GG	E39	
	104	80	BLK/YEL BLK/ORN	21 21	A A	u v	XK2-9 XK2-12	SEE FIG. 2 SEE FIG. 2
TW	105	62	WHT-BLK-VIO	21	A	w	XK5-20	
	106	63	WHT-BLK-GY	21	A	x	XK5-14	
TW	107	65	WHT-BRN-ORN	21	A	y	XK5-11	
	108	64	WHT-BRN-RED	21	A	z	XK5-17	
TW	109	13	WHT-GY	39	B	AA	XK11-6	
	110	12	WHT-VIO	36	B	BB	E24	
	111	11	WHT-BLU	36	B	HH	E23	
TW	112	48	WHT-BLU-GY	15	A	CC	E38	
	113	49	WHT-VIO-GY	17	A	J1-DD	E36	
	114	56	WHT-BLK-BRN	63	A	E37	M3-5	
TW	115	13	WHT-GY	20	A	E37	XA2-F	
	116	12	WHT-VIO	19		E39	XA2-H	
	117	1	BLK	19	A	E40	T2-3	
	118	7	WHT-RED	21	A	E40	XK4-5	
	119	7	WHT-RED	38	A	XK12-1	S5-C7	
	120	8	WHT-ORN	16	A	XK12-2	XK6-2	
TW	122	5	WHT-BLK	39	A	XK12-5	S5-B13	
	123	6	WHT-BRN	39	A	XK12-8	S5-A13	

	CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
	NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
	124	26	WHT-BRN-BLU	43	A	XK6-1	S6-A3	
	125	28	WHT-BRN-GY	12		2	XK5-2	
	126	25	WHT-BRN-GRN	10		9	XK7-7	
	127	11	WHT-BLU	12		10	XK5-9	
TW	128	56	WHT-BLK-BRN	50	A	11	M2-1	
	129	57	WHT-BLK-RED	51	A	17	M2-2	
	130	24	WHT-BRN-YEL	10		12	XK7-10	
	131	36	WHT-ORN-GRN	12		13	XK5-12	
TW	132	50	WHT-BLK	52	A	14	M2-3	
	133	62	WHT-BLK-VIO	53	A	20	M2-4	
	134	23	WHT-BRN-ORN	10		15	XK7-13	
	135	37	WHT-ORN-BLU	12		16	XK5-15	
	136	22	WHT-BRN-RED	10		18	XK7-16	
	137	35	WHT-ORN-YEL	12		XK6-19	XK5-18	
	138	5	WHT-BLK	45	A	XK7-1	S6-A2	
	139	17	WHT-BLK-YEL	13		2	XK2-2	
	140	31	WHT-RED-GRN	19	A	2	XK10-2	
TW	141	11	WHT-BLU	36	A	9	S5-B2	
	142	10	WHT-GRN	36	A	15	S5-A2	
TW	143	12	WHT-VIO	36	A	17	S5-A4	
	144	13	WHT-GY	36	A	XK7-11	S5-B4	
	145	42	WHT-YEL-VIO	46	A	XK5-1	S6-A4	
	146	43	WHT-YEL-GY	10		2	XK2-2	
TW	147	68	WHT-ORN-VIO	60	A	11	M3-1	
	148	69	WHT-ORN-GY	61	A	17	M3-2	
TW	149	70	WHT-YEL-GRN	62	A	14	M3-3	
	150	71	WHT-YEL-BLU	63	A	XK5-20	M3-4	
	151	46	WHT-GRN-GY	41	A	XK2-1	S8-A3	
	152	11	WHT-BLU	20	A	XK2-1	XK10-1	
	156	53	WHT-ORN	3		SHLD COND 47	SHLD COND 97	SEE FIG. 1
	157	52	WHT-RED	3		SHLD COND 47	XK2-7	SEE FIG. 1
	158	51	WHT-BRN	3		SHLD COND 57	SHLD COND 104	SEE FIG. 2
	159	65	WHT-BRN-ORN	3		SHLD COND 57	XK2-13	SEE FIG. 2
	160	78	BLK/GRN	14		XK2-4	XA2-B	
	161	70	WHT-YEL-GRN	14		7	XA2-C	
	162	66	WHT-RED-ORN	28	A	7	XK11-10	
	163	79	BLK/WHT-BLK	14	A	10	XA1-B	
	164	71	WHT-YEL-BLU	14	A	13	XA1-C	
	165	64	WHT-BRN-RED	28	A	XK2-13	XK11-4	
	166	7	WHT-RED	31	A	XA2-A	XA1-A	
	167	41	WHT-YEL-BLU	40		A	E29	
	168	24	WHT-BRN-YEL	31	A	R	XA1-R	
	169	23	WHT-BRN-ORN	31	A	P	XA1-P	
TW	170	8	WHT-ORN	31	A	F	XA1-F	
	171	11	WHT-BLU	31	A	H	XA1-H	
	172	38	WHT-ORN-VIO	18		J	E9	
	173	14	WHT-BLK-BRN	31		K	XA1-K	
	174	9	WHT-YEL	40		XA2-P	E29	
	175	51	WHT-BRN	3		SHLD COND 160	SHLD COND 177	SEE FIG 4
	176	50	WHT-BLK	3		SHLD COND 160	XA2-S	SEE FIG. 4
	177	76	BLK/RED	48		XA2-B	S9-A4	SEE FIG. 4
	178	43	WHT-YEL-GY	33		XA2-N	XK11-13	
	179	15	WHT-BLK-RED	23	A	E5	XK10-5	
	180	14	WHT-BLK-BRN	21	A	E6	XK10-11	
	181	35	WHT-ORN-YEL	28	A	E5	XA1-J	
	182	34	WHT-RED-GY	27		E6	XA1-D	
	183	45	WHT-GRN-VIO	21	B	E12	E29	
	184	37	WHT-ORN-BLU	16		E10	XA2-D	
	185	100	BLU	14	B	E29	T3-5	
	186	5	WHT-BLK	20	B	E29	XK8-12	
	187	6	WHT-BRN	30	B	E29	S9-B5	
	188	7	WHT-RED	30	B	E29	S9-B4	
	189	10	WHT-GRN	18		E29	XK11-2	
	190	5	WHT-BLK	24		R7-2	R6-3	
	191	10	WHT-GRN	12		R7-1	T3-5	
	192	33	WHT-RED-VIO	18		XK10-1	XK11-1	
	193	17	WHT-BLK-YEL	14		2	XK4-2	
	194	5	WHT-BLK	15		3	XK9-4	
	195	34	WHT-RED-GY	13		5	XK1-5	
	196	6	WHT-BRN	15		6	XK9-7	
	197	8	WHT-ORN	14		12	XK4-4	
	198	42	WHT-YEL-VIO	13		14	XK1-14	
	199	13	WHT-GY	29	A	14	E9	
	200	9	WHT-YEL	14		15	XK4-7	
	201	2	ORN	13		17	XK1-17	
	202	10	WHT-GRN	14		18	XK4-10	
	203	1	BLK	13		20	XK1-20	
	204	12	WHT-VIO	28	A	XK10-20	E10	
	205	5	WHT-BLK	27	A	T2-1	T1-2	
	206	6	WHT-BRN	27	A	-2	T1-3	
	207	7	WHT-RED	34	A	3	M1-1	
	208	8	WHT-ORN	20	A	5	S2-A1	
	209	9	WHT-YEL	20	A	T2-6	S2-A2	
	210	14	WHT-BLK-BRN	22		E1	S2-B1	
	211	15	WHT-BLK-RED	21		E2	S2-B2	
	212	43	WHT-YEL-GY	25		XK4-1	S7-A4	
	213	46	WHT-GRN-GY	11		2	XK1-2	
	214	12	WHT-VIO	14		3	XK9-9	
	215	44	WHT-GRN-BLU	14		5	XK9-5	
	216	3	GRN	14		11	XK9-11	
	217	13	WHT-GY	24		XK4-11	S2-A7	
	218	41	WHT-YEL-BLU	37	A	XK1-1	S8-A1	
	219	45	WHT-GRN-VIO	11		2	XK9-2	
	220	40	WHT-YEL-GRN	13		3	XK8-19	
	221	39	WHT-ORN-GY	13		6	XK8-16	
	222	38	WHT-ORN-VIO	13		9	XK8-13	
	223	35	WHT-ORN-YEL	11		12	XK3-19	
	224	15	WHT-BLK-RED	11		15	XK3-16	
	225	14	WHT-BLK-BRN	11		XK1-18	XK3-13	
	226	9	WHT-YEL	21	A	XK9-1	S7-A5	
	227	48	WHT-BLU-GY	11		2	XK3-2	
	228	38	WHT-ORN-VIO	11		3	XK3-18	
	229	10	WHT-GRN	11		5	XK3-20	
	230	36	WHT-ORN-GRN	11		XK9-11	XK3-14	
	231	17	WHT-BLK-YEL	39	B	XK3-1	S7-A2	
	232	49	WHT-VIO-GY	11		XK3-2	XK8-2	
	233	43	WHT-YEL-GY	11		XK3-12	XK8-18	
	234	18	WHT-BLK-GRN	11		XK3-20	XK8-20	
	235	77	BLK/BLK	37	B	XA1-B	S9-A5	SEE FIG. 3
	236	65	WHT-BRN-ORN	3		SHLD COND 163	SHLD COND 235	SEE FIG. 3
	237	64	WHT-BRN-RED	3		SHLD COND 163	XA1-S	SEE FIG. 3
	238	3	GRN	15		XA1-N	XK11-7	
	239	20	WHT-BLK-VIO	37	B	XK8-1	S7-A3	
	240	48	WHT-BLU-GY	11		XK8-2	XK11-2	
	241	47	WHT-BLU-VIO	37	B	XK8-20	S1-1	
TW	242	38	WHT-ORN-VIO	36	B	XK11-3	S5-A5	
	243	24	WHT-ORN-BLU	36	B	6	S5-B5	
TW	244	23	WHT-ORN-YEL	36	B	12	S5-B3	
	245	36	WHT-ORN-GRN	36	B	9	S5-A3	
TW	246	39	WHT-ORN-GY	36	B	5	S5-A7	
	247	40	WHT-YEL-GRN	36	B	8	S5-B7	
TW	248	41	WHT-YEL-BLU	36	B	11	S5-A6	
	249	42	WHT-YEL-VIO	36	B	14	S5-B6	
	250	23	WHT-BRN-ORN	32		4	S9-B3	
	251	6	WHT-BRN	10		11	E22	
	252	7	WHT-RED	9		5	E20	
	253	5	WHT-BLK	10		XK11-3	E24	

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
254	24	WHT-BRN-YEL	32		XK11-10	S9-B2	
255	6	WHT-BRN	20	B	T3-1	XDS1-2	
256	14	WHT-BLK-BRN	24	B	T3-3	CB1-2	
257	8	WHT-ORN	25	B	T3-6	R6-1	
258	13	WHT-GY	25	B	E25	R6-2	
259	5	WHT-BLK	29	B	E26	S3-A13	
260	5	WHT-BLK	27	B	S2-B1	M1-2	
261	4	WHT	21		S7-A13	S5-C13	
262	7	WHT-RED	15		T1-1	S1-2	
263	14	WHT-BLK-BRN	15		T1-2	S1-5	
264	53	WHT-ORN	32		S1-1	M2-6	
265	96	WHT-YEL	31		S1-4	M2-5	
266	97	WHT-BLU	46		S1-4	M3-5	
267	30	WHT-RED-ORN	29		S5-A1	S9-B13	
268	34	WHT-RED-GY	29		S5-B1	S9-A13	
269	31	WHT-RED-GRN	29		S5-C2	S9-C5	
270	49	WHT-VIO-GY	18		S5-C13	S8-A13	
271	48	WHT-BLU-GY	31		S8-A13	S9-C13	
272	5	WHT-BLK	31		S8-B3	M4-1	
273	9	WHT-YEL	25		S8-B13	XDS1-1	
274	51	WHT-BRN	60		M2-7	M3-6	
275	8	WHT-ORN	27		M4-2	XDS1-2	
276	5	WHT-BLK	15		CB1-2	XDS1-1	
277	41	WHT-YEL-BLU	20		S9-C13	S6-A13	
278	4	WHT	24		J3-U	E39	
279	43	WHT-YEL-GY	13		XK10-11	XK1-11	
280	7	WHT-RED	14		XK10-9	XK9-10	
281	5	WHT-BLK	25	A	XK1-8	S7-A13	
282	71	WHT-YEL-BLU	71		XK3-14	XK8-14	

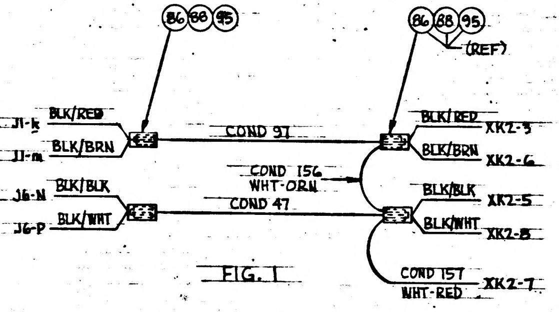


FIG. 1

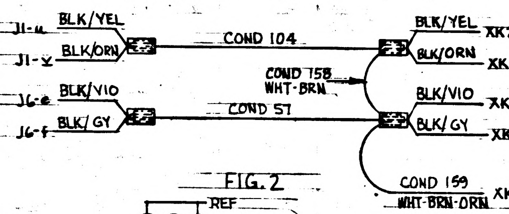


FIG. 2

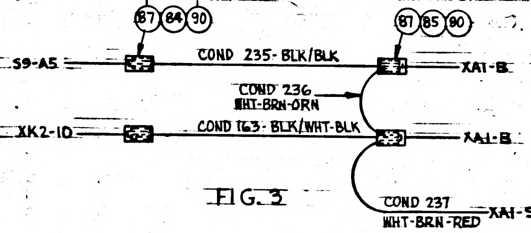


FIG. 3

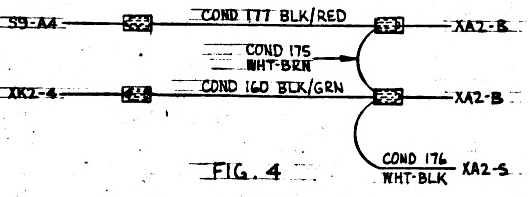


FIG. 4

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07040 DATE 3/17/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
98	14"		SEE NOTE 3			WIRE, ELECTRICAL (BLU) (AWG 20)			
97	46"		SEE NOTE 3			WIRE, ELECTRICAL (WHT-BLU) (AWG 22)			
96	31"		SEE NOTE 3			WIRE, ELECTRICAL (WHT-YEL) (AWG 22)			
95	8		1010490-136	6002503 5005		INSULATION, SLEEVING (5/8" LG)			
94	AR		1011753	6003503 7002		TAPE, LACING & TYING			
93	1		1015865-364	6002503 5054		INSULATION SLEEVING (2" LG)			
92	14		MS17182-2	6810101 6801		TERMINAL, INSULATED			
91	4		MS25036-1	6810000 3407		TERMINAL, INSULATED			
90	8		1010490-138	6002503 5008		INSULATION, SLEEVING (5/8" LG)			
89	3		MS25036-3	6810000 3410		TERMINAL, INSULATED			
88	8		1000243-12	7409404 5027		FERRULE (INNER)			
87	8		1000243-5	7409404 5021		FERRULE (INNER)			
86	8		1000242-14	7409404 5007		FERRULE (OUTER)			
85	4		1000242-8	7409404 5003		FERRULE (OUTER)			
84	4		1000242-5	7409404 5002		FERRULE (OUTER)			
83	21"		SEE NOTE 7			CABLE, ELECTRICAL (BLK/BRN, RED) (AWG 20)			
82	24"					(BLK/VIO, GY)			
81	24"					(BLK/BLK, WHT)			
80	71"					(BLK/YEL, ORN			
79	14"		SEE NOTE 7			(BLK/WHT-BLK)			
78	[illegible]		SEE NOTE 7			(BLK/GRN)			
77	37"		SEE NOTE 6			(BLK/BLK)			
76	48"		SEE NOTE 6			CABLE ELECTRICAL (BLK/RED) (AWG 20)			
75	34"		SEE NOTE 3			WIRE, ELECTRICAL (GY) (AWG 16)			
74	15"					(YEL) (AWG 16)			
73	14"					(WHT-BLK (AWG 16)			
72	22"					(WHT-BLU-GY) (AWG 22)			
71	88"					(YEL-BLU)			
70	76"					(YEL-GRN)			
69	61"					(ORN-GY)			
68	60"					(ORN-VIO)			
67	37"					(RED-BLU)			
66	28"					(RED-ORN)			
65	27"					(BRN-ORN)			
64	52"					(BRN-RED)			
63	21"					(BLK-GY)			
62	74"					(VIO)			
61	20"					(BLU)			
60	20"					(GRN)			
59	20"					(YEL)			
58	20"					(ORN)			
57	51"					(RED)			
56	113"					(BLK-BRN)			
55	22"					(VIO)			
54	22"					(GRN)			
53	59"					(ORN)			
52	27"					(RED)			
51	87"					(BRN)			
50	79"					(BLK) (AWG 22)			
49	172"					(VIO-GY) (AWG 20)			
48	179"					(BLU-GY)			
47	189"					(BLU-VIO)			
46	156"					(GRN-GY)			
45	47"					(GRN-VIO)			
44	14"					(GRN-BLU)			
43	168"					(YEL-GY)			
42	179"					(YEL-VIO)			
41	189"					(YEL-BLU)			
40	150"					(YEL-GRN)			
39	109"					(ORN-GY)			
38	61"					(VIO)			
37	89"					(BLU)			
36	106"					(GRN)			
35	71"					(ORN-YEL)			
34	89"					(RED-GY)			
33	58"					(VIO)			
32	42"					(BLU)			
31	107"					(GRN)			
30	133"					(YEL)			
29	27"					(RED-ORN)			
28	72"					(BRN-GY)			
27	61"					(VIO)			
26	96"					(BLU)			
25	38"					(GRN)			
24	168"					(YEL)			
23	137"					(ORN)			
22	38"					(BRN-RED)			
21	28"					(BLK-GY)			
20	65"					(VIO)			
19	28"					(BLU)			
18	28"					(GRN)			
17	82"					(YEL)			
16	60"					(ORN)			
15	136"					(RED)			
14	156"					(BLK-BRN)			
13	203"					(GY)			
12	144"					(VIO)			
11	181"					(BLU)			
10	133"					(GRN)			
9	185"					(YEL)			
8	177"					(ORN)			
7	212"					(RED)			
6	179"					(BRN)			
5	345"					(BLK)			
4	65"					(WHT)			
3	43"					(GRN)			
2	13"					(ORN)			
1	76"		SEE NOTE 3			WIRE ELECTRICAL (BLK) (AWG 20)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 1102011042 0

DRAWN L. MARGIOTTA DATE 1-13-64
CHECKED J. Scagliola 3/10/64
APPROVAL
APPROVAL W. Sayre 3.16.64
NASA APPROVAL 3-17-64
3/17/64
MIT APPROVAL 17 Mar 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL, FUNCTIONAL TESTER
WIRING HARNESS, BRANCHED

CODE IDENT NO.
SIZE E
NASA NUMBER 1019738
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

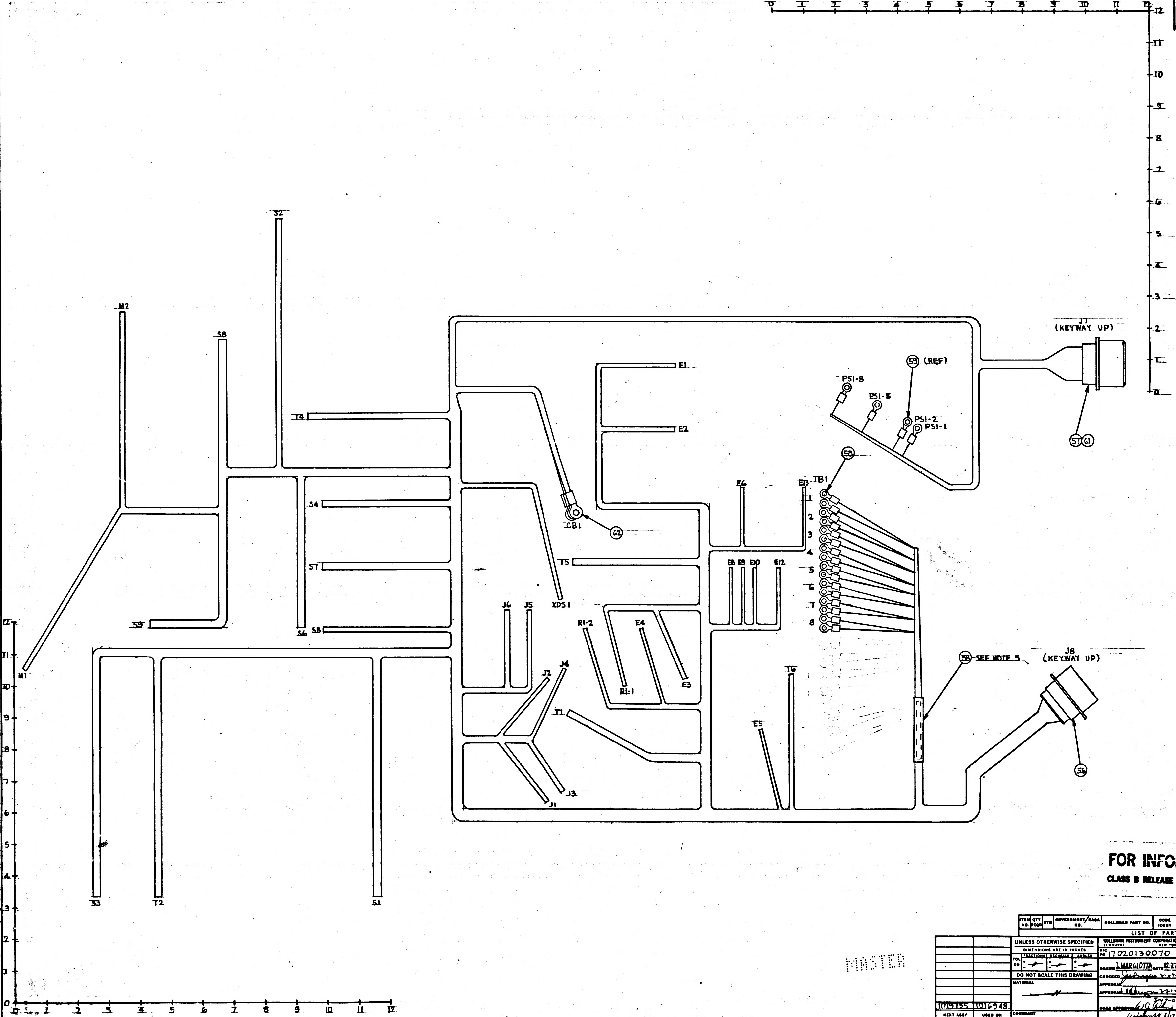
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019739

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL


S2
M2
S8
T4
E1
E2
PS1-8
PS1-5
59 (REF)
PS1-2
PS1-1
J7
(KEYWAY UP)
57 61
59
TB1
E6
E13
1
2
3
4
5
6
7
8
CB1
62
S4
T5
S7
E8 E9 E10 E12
XDS1
J6
J5
S9
S6
S5
R1-2
E4
M1
J4
J2
R1-1
E3
58 SEE NOTE 5
J8
(KEYWAY UP)
T6
T1
E5
56
J1
J3
S3
T2
S1

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07046 DATE 3/17/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019735	1016948

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130070
DRAWN L MARGIOTTA DATE 12-27-63
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 3-17-64
3/17/64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MAP AND DATA VIEWER, CONTROL PANEL, WIRING HARNESS, BRANCHED

CODE IDENT NO.
SIZE E
NASA NUMBER 1019739
SCALE
WEIGHT CALC ACTUAL
SHEET 1 OF

1019739

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. WIRE PER ND 1002032.
3. WIRE - ND1002181, TYPE I, CLASS I
4. TIE WIRES TOGETHER USING ITEM NO. 60 AT APPROX 1/2" SPACING
5. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM PER ND 1002019.

	CONDUCTOR							
	NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
	1	54	BLK	33"		J7-B	XDS1-2	
	2	55	WHT	32"		J7-C	CB1-1	
	3	23	WHT-BLK-GRN	17"		J8-A	E5	
TWIST	4	3	RED	18"		B	T6-1	
	5	2	BRN	18"		C	T6-2	
TWIST	6	4	ORN	39"		D	S1-A-6A	
	7	1	BLK	39"		X	S1-A-5A	
TWIST	8	21	WHT-BLK-ORN	36"		E	S7-1	
	9	22	WHT-BLK-YEL	36"		F	S7-3	
	10	13	WHT-ORN	34"		G	S5-2-NO	
	11	38	WHT-RED-VIO	47"		H	S9-A11	
	12	39	WHT-RED-GY	20"		J	TB1-4	
	13	24	WHT-BLK-BLU	47"		K	S9-A2	
	14	50	WHT-GRN-VIO	47"		L	S9-A12	
TWIST	15	53	WHT-VIO-GY	38"		M	S4-1-C	
	16	11	WHT-BRN	38"		N	S4-1-NC	
TWIST	17	14	WHT-YEL	34"		P	S5-1-NC	
	18	15	WHT-GRN	34"		R	S5-1-C	
TWIST	19	18	WHT-GY	23"		S	E10	
	20	19	WHT-BLK-BRN	27"		T	E12	
	21	10	WHT	18"		U	TB1-7	
	22	25	WHT-BLK-VIO	18"		V	TB1-8	
	23	26	WHT-BLK-GY	47"		W	S9-A3	
TWIST	24	5	YEL	39"		Y	S1-A-4A	
	25	6	GRN	39"		Z	S1-A-3A	
	26	9	GY	23"		a	T1-5	
	27	17	WHT-VIO	25"		c	E9	
	28	36	WHT-RED-GRN	47"		d	S9-A10	
	29	37	WHT-RED-BLU	19"		e	TB1-5	
	30	51	WHT-GRN-GY	21"		f	TB1-1	
	31	48	WHT-YEL-GY	47"		g	S9-A13	
	32	20	WHT-BLK-RED	39"		h	S1-A-2A	
	33	16	WHT-BLU	26"		i	S6-1	
	34	12	WHT-RED	34"		j	S5-1-NO	
	35	40	WHT-ORN-YEL	47"		m	S9-A14	
	36	41	WHT-ORN-GRN	20"		n	TB1-3	
	37	27	WHT-BRN-RED	19"		p	TB1-6	
	38	28	WHT-BRN-ORN	47"		q	S9-A4	
TWIST	39	7	BLU	48"		s	S3-B3	
	40	8	VIO	48"		t	S3-B2	
	41	34	WHT-RED-ORN	28"		u	R1-1	
	42	35	WHT-RED-YEL	20"		v	TB1-4	
	43	49	WHT-GRN-BLU	20"		w	TB1-1	
	44	46	WHT-YEL-BLU	47"		x	S9-A8	
	45	44	WHT-ORN-GY	47"		y	S9-A7	
	46	42	WHT-ORN-BLU	47"		z	S9-A15	
	47	43	WHT-ORN-VIO	21"		AA	TB1-2	
	48	29	WHT-BRN-YEL	18"		BB	TB1-7	
	49	30	WHT-BRN-GRN	47"		CC	S9-A5	
	50	31	WHT-BRN-BLU	19"		HH	TB1-5	
	51	32	WHT-BRN-VIO	47"		DD	S9-A6	
	52	33	WHT-BRN-GY	19"		EE	TB1-6	
	53	47	WHT-YEL-VIO	21"		FF	TB1-2	
	54	45	WHT-YEL-GRN	20"		J8-GG	TB1-3	
	55	5	YEL	36"		TB1-8	J5	
	56	18	WHT-GY	12"		E4	E8	
	57	15	WHT-GRN	42"		T6-1	S2-A-C	
	58	12	WHT-RED	33"		T6-4	S1-B-7A	
	59	8	VIO	33"		T6-3	S1-A-7A	
	60	8	VIO	45"		T1-1	M1-2	
	61	18	WHT-GY	18"		T1-1	T5-3	
	62	10	WHT	33"		T1-4	XDS1-1	
	63	7	BLU	18"		T1-5	E6	
	64	14	WHT-YEL	17"		T1-6	E13	
	65	2	BRN	39"		T1-6	T2-2	
	66	18	WHT-GY	39"		S2-B-B2	S6-1	
	67	13	WHT-ORN	42"		R1-2	S9-A9	
	68	11	WHT-BRN	27"		E8	J6	
	69	5	YEL	40"		T5-1	T4-2	
	70	3	RED	40"		T5-2	T4-3	
	71	15	WHT-GRN	63"		T5-3	PS1-2	
	72	16	WHT-BLU	47"		T5-4	S2-A-C2	
	73	17	WHT-VIO	47"		T5-5	S2-A-C3	
	74	9	GY	38"		E6	S1-B-1A	
	75	20	WHT-BLK-RED	52"		E2	S2-B-A3	
	76	19	WHT-BLK-BRN	54"		E1	S2-B-A2	
	77	13	WHT-ORN	37"		PS1-1	CB1-2	
	78	11	WHT-BRN	50"		PS1-5	S1-B-2A	
	79	12	WHT-RED	48"		PS1-8	S9-A	
	80	2	BRN	8"		J1	J2	
	81	7	BLU	8"		J3	J4	
	82	3	RED	20"		J2	S1-A-13A	
	83	14	WHT-YEL	21"		J4	S1-B-13A	
	84	8	VIO	14"		J6	S5-2-C	
	85	52	WHT-BLU-GY	19"		J5	S1-B-6A	
	86	2	BRN	27"		S1-A-1A	S3-A2	
	87	7	BLU	20"		S1-A-2A	S7-2	
	88	10	WHT	25"		S1-B-1A	T2-4	
	89	13	WHT-ORN	32"		T6-2	S2-B-C	
	90	27	WHT-BRN-RED	20"		T2-3	S3-A	
	91	1	BLK	42"		S3-C2	S2-A-A	
	92	30	WHT-BRN-GRN	42"		S3-D2	S2-A-B	
	93	24	ORN	40"		S3-C	S9-A	
	94	29	WHT-BRN-YEL	45"		S3-D	M1-1	
	95	1	BLK	15"		S5-1-NO	S4-1-NO	

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
96	2	BRN	15"		S5-2-NO	S4-2-NO	
97	9	GY	13"		S5-3-C	S7-5	
98	5	YEL	13"		S5-3-NO	S7-4	
99	33	WHT-BRN-GY	21"		S5-3-NO	S6-3	
100	4	ORN	14"		S7-4	S4-3-NO	
101	3	RED	14"		S7-5	S4-3-C	
102	26	WHT-BLK-GY	22"		S4-1-NO	S2-A-A1	
103	21	WHT-BLK-ORN	45"		E3	S2-B-B	
104	22	WHT-BLK-YEL	17"		S6-1	S2-B-B2	
105	23	WHT-BLK-GRN	23"		S2-A-B2	M1-1	
106	14	WHT-YEL	17"		S2-A-B3	S8-4	
107	4	ORN	19"		S2-A-C	S2-B-A	
108	12	WHT-RED	23"		S2-A-B	XDS1-1	
109	8	VIO	24"		S2-B-A2	M2-1	
110	25	WHT-BLK-VIO	17"		S2-B-C2	S8-1	
111	24	WHT-BLK-BLU	23"		S2-B-C3	XDS1-2	
112	1	BLK	18"		S8-1	M2-2 (+)	
113	6	GRN	21"		S8-2	T4-1	
114	2	BRN	21"		S8-5	T4-2	
115	4	ORN	15"		M2-2 (+)	M1-2	
116	2	BRN	18"		XDS1-1	CB1-2	

REFERENCE DRAWINGS:
1. SCHEMATIC DIAGRAM 1019742
2. WIRING DIAGRAM 1019736

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
62	3		MS25036-3			TERMINAL, INSULATED			
61	2		1010490-112	60025035006		INSULATION, SLEEVING (1/2" LG)			
60	AR		1011753-	60035037002		TAPE LACING & TYING			
59	[illegible]		[illegible]			TERMINAL, INSULATED			
58	1		1015865-462	60025035055		INSULATION SLEEVING (2" LG)			
57	1		MS3102A 22 22P			CONNECTOR, PLUG			
56	1		MS3127E22 55S			CONNECTOR, PLUG			
55	32"		SEE NOTE 3			WIRE, ELECTRICAL (WHT)(AWG 16)			
54	33"					(BLK)(AWG 16)			
53	38"					(WHT-VIO-GY) (AWG 20)			
52	19"					(BLU-GY)			
51	21"					(GRN-GY)			
50	47"					(GRN-VIO)			
49	20"					(GRN-BLU)			
48	47"					(YEL-GY)			
47	21"					(YEL-VIO)			
46	63"					(YEL-BLU)			
45	20"					(YEL-GRN)			
44	47"					(ORN-GY)			
43	21"					(VIO)			
42	47"					(BLU)			
41	20"					(-GRN)			
40	47"					(ORN-[illegible])			
39	20"					(RED-GY)			
38	47"					(VIO)			
37	19"					(BLU)			
36	47"					(GRN)			
35	20"					(YEL)			
34	28"					(RED-ORN)			
33	40"					(BRN-GY)			
32	47"					(VIO)			
31	19"					(BLU)			
30	89"					(GRN)			
29	63"					(YEL)			
28	47"					(ORN)			
27	64"					(BRN-RED)			
26	69"					(BLK-GY)			
25	74"					(VIO)			
24	80"					(BLU)			
23	40"					(GRN)			
22	53"					(YEL)			
21	81"					(ORN)			
20	91"					(RED)			
19	81"					(BLK-BRN)			
18	53"					(GY)			
17	64"					(VIO)			
16	73"					(BLU)			
15	139"					(GRN)			
14	72"					(YEL)			
13	105"					(ORN)			
12	80"					(RED)			
11	115"					(BRN)			
10	78"					(WHT)			
9	74"					(GY)			
8	164"					(VIO)			
7	94"					(BLU)			
6	[illegible]					(GRN)			
5	120"					(YEL)			
4	177"					(ORN)			
3	92"					(RED)			
2	146"					(BRN)			
1	114"		SEE NOTE 3			WIRE, ELECTRICAL (BLK)		(AWG 20)	

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07046 DATE 3/17/64

MASTER

NEXT ASSY	USED ON
1019735	1016948

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17C20130070
DRAWN I. MARGIOTTA DATE 12-9-63
CHECKED
APPROVAL
APPROVAL 3-17-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

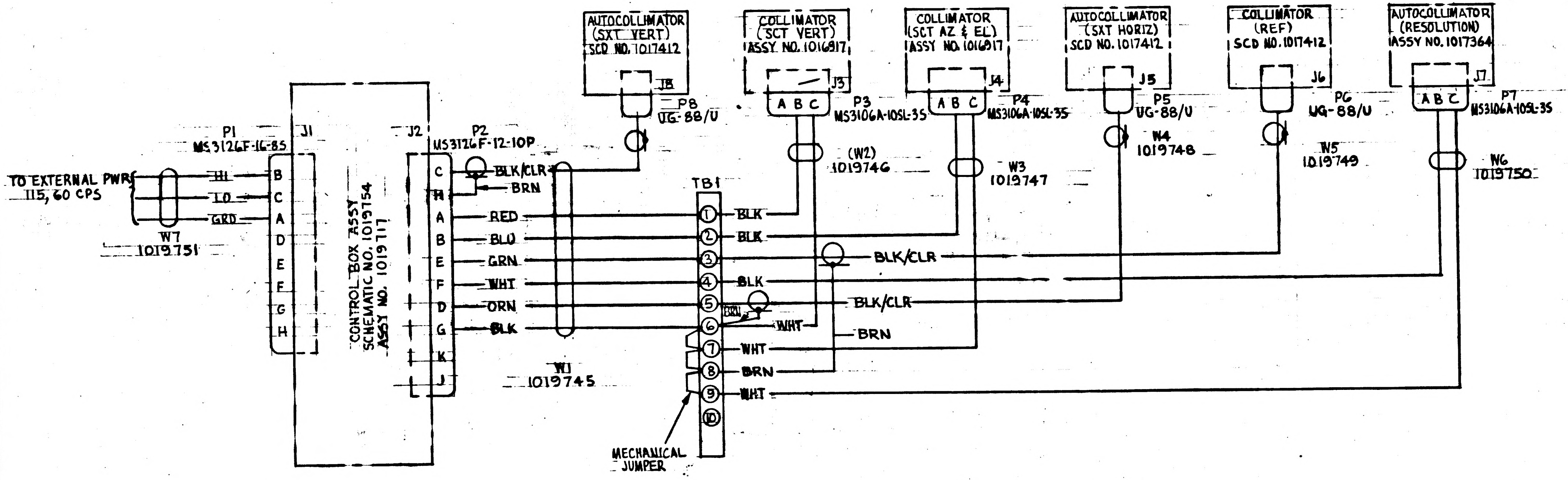
TITLE
MAP AND DATA VIEWER, CONTROL PANEL, WIRING HARNESS, BRANCHED

CODE IDENT NO.
SIZE E
NASA NUMBER 1019739
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019740 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	C-8	ADDED WIRE (GRD) TO P1-A	2-25-64 #104999	
		TDRR 07165	3/6/64	



AUTOCOLLIMATOR (SXT VERT) SCD NO. 1017412
J8
P8 UG-88/U
COLLIMATOR (SCT VERT) ASSY NO. 1016917
J3
A B C
P3 MS3106A-10SL-3S
(W2) 1019746
COLLIMATOR (SCT AZ & EL) ASSY NO. 1016917
J4
A B C
P4 MS3106A-10SL-3S
W3 1019747
AUTOCOLLIMATOR (SXT HORIZ) SCD NO. 1017412
J5
P5 UG-88/U
W4 1019748
COLLIMATOR (REF) SCD NO. 1017412
J6
P6 UG-88/U
W5 1019749
AUTOCOLLIMATOR (RESOLUTION) ASSY NO. 1017364
J7
A B C
P7 MS3106A-10SL-3S
W6 1019750
TO EXTERNAL PWR 115, 60 CPS
HI
LO
GRD
W7 1019751
P1 MS3126F-16-8S
J1
B C A D E F G H
CONTROL BOX ASSY SCHEMATIC NO. 1019754 ASSY NO. 1019717
J2
P2 MS3126F-12-10P
C H A B E F D G K J
BLK/CLR
BRN
RED
BLU
GRN
WHT
ORN
BLK
W1 1019745
TB1
① BLK
② BLK
③ BLK/CLR
④ BLK
⑤ BLK/CLR
BRN
⑥ WHT
BRN
⑦ WHT
⑧ BRN
⑨ WHT
⑩
MECHANICAL JUMPER

1019740 A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. D6140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

1016910	1016910
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 1T020040020
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. ANDERSON 1-7-64
APPROVAL R Ferrei 2-27-64
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRECISION TEST FIXTURE
INTERCONNECTION DIAGRAM

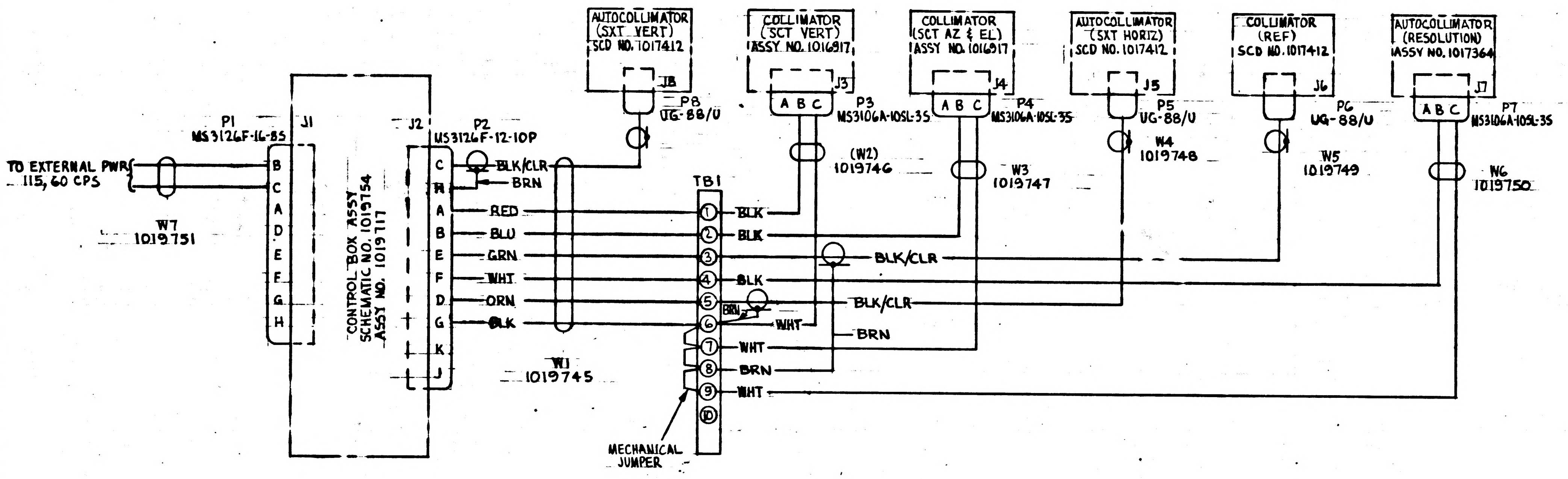
CODE IDENT NO.
SIZE D
NASA NUMBER 1019740
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019740

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327


AUTOCOLLIMATOR (SXT VERT) SCD NO. 1017412
J8
P8 UG-88/U
COLLIMATOR (SCT VERT) ASSY NO. 1016917
J3
P3 MS3106A-10SL-3S
COLLIMATOR (SCT AZ & EL) ASSY NO. 1016917
J4
P4 MS3106A-10SL-3S
AUTOCOLLIMATOR (SXT HORIZ) SCD NO. 1017412
J5
P5 UG-88/U
COLLIMATOR (REF) SCD NO. 1017412
J6
P6 UG-88/U
AUTOCOLLIMATOR (RESOLUTION) ASSY NO. 1017364
J7
P7 MS3106A-10SL-3S
(W2) 1019746
W3 1019747
W4 1019748
W5 1019749
W6 1019750
P1 MS3126F-16-8S
J1
J2
P2 MS3126F-12-10P
TO EXTERNAL PWR 115, 60 CPS
W7 1019751
B C A D E F G H
CONTROL BOX ASSY SCHEMATIC NO. 1019754 ASSY NO. 1019117
C H A B E F D G K J
BLK/CLR
BRN
RED
BLU
GRN
WHT
ORN
BLK
W1 1019745
TB1
1 2 3 4 5 6 7 8 9 10
BLK
BLK
BLK/CLR
BLK
BLK/CLR
BRN
WHT
BRN
WHT
BRN
WHT
MECHANICAL JUMPER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. D6140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT W

LIST OF PARTS AND MATERIALS

1016910	1016910
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020040020
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. ANGSPAN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRECISION TEST FIXTURE
INTERCONNECTION DIAGRAM

CODE IDENT NO.
SIZE D
NASA NUMBER 1019740
SCALE ~
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

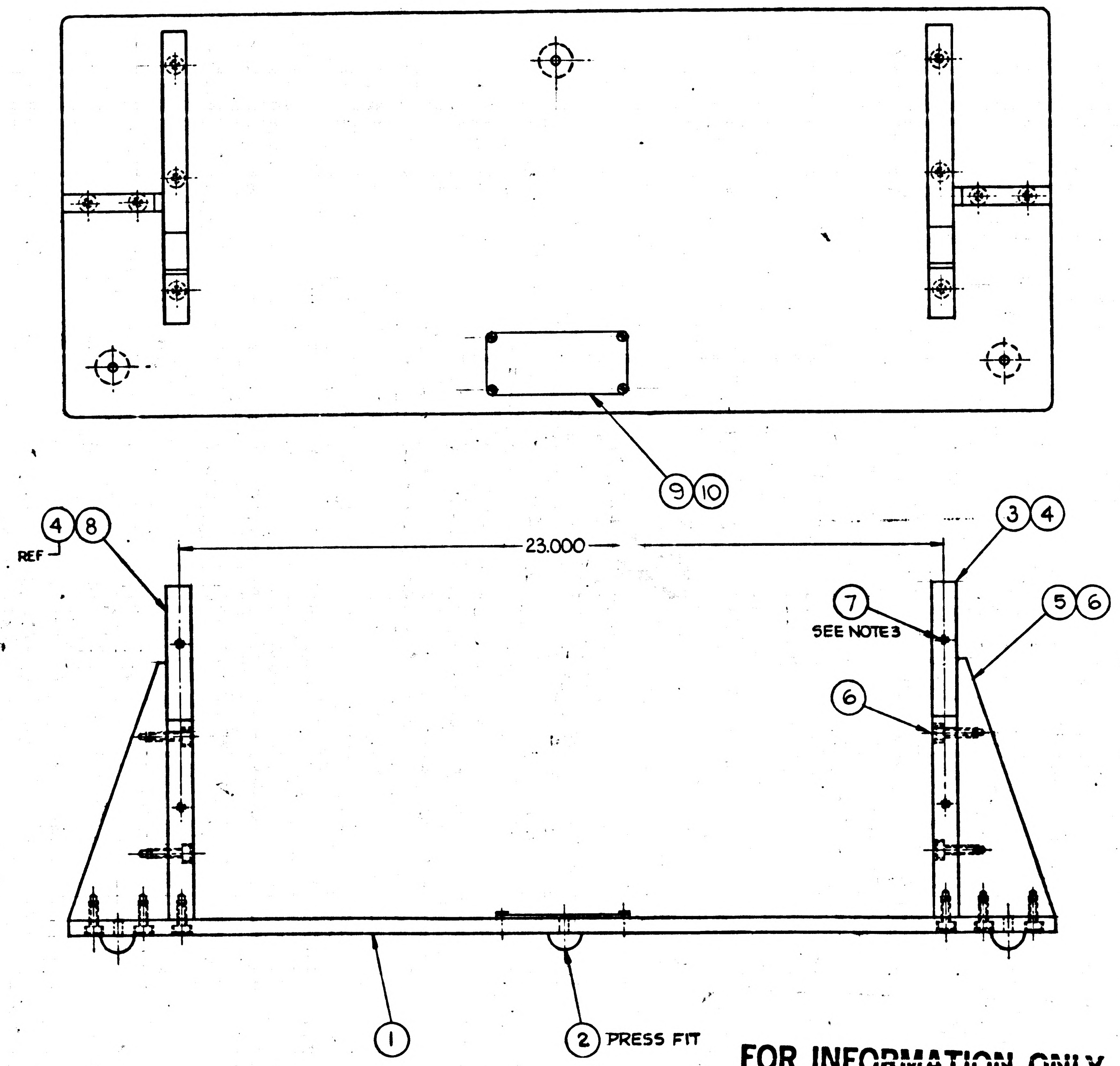
MASTER

B 1019741

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY PER ND1002019.
3.) INSTALL HELI-COIL PER MS33537.
Ⓑ 4.) THIS UNIT TO BE SUPPLIED WITH THE MAP & DATA VIEWER TESTER, PART NO. 1016948.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	A-3	ADDED 1016948 TO USED ON	1/9/64	ECP NO 105174
B	F-8	ADDED NOTE 4 TDRR 09072 DATE	4-23-64 J.H.	ECP 10591



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	4		MS24646-1	74455075001		SCREW			
9	1		1019157	16020130170		PLATE, IDENTIFICATION			
8	1		1019149	16020130150		BRACKET, LEFT			
7	4		MS124815			HELI-COIL INSERT (#10-32)			
6	4		1017418-36	74455058036		SCREW, CAP, SOC HD (#1/4-20)			
5	2		1019139	16020130100		BRACKET			
4	10		1017418-34	74455058034		SCREW, CAP, SOC HD (#1/4-20)			
3	1		1019140	16020130110		BRACKET, RIGHT			
2	3		1019138	16020130090		BUTTON			
1	1		1019141	16020130120		BASE			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY Ⓐ

CLASS B RELEASE TDR No. 05027 DATE 10 dec 63

NEXT ASSY	USED ON
1016948	1016948

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130080
DRAWN C. Borgooly DATE 11-18-63
CHECKED Earl Sargoly 11-18-63
APPROVAL
APPROVAL [illegible] 11-20-63
NASA APPROVAL [illegible] 12/4/63
[illegible] 12-4-63
MIT APPROVAL [illegible] 12/10/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MAP & DATA VIEWER
STAND ASSY

CODE IDENT NO.
SIZE D
NASA NUMBER 1019741
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF

INCHES 0 1 2

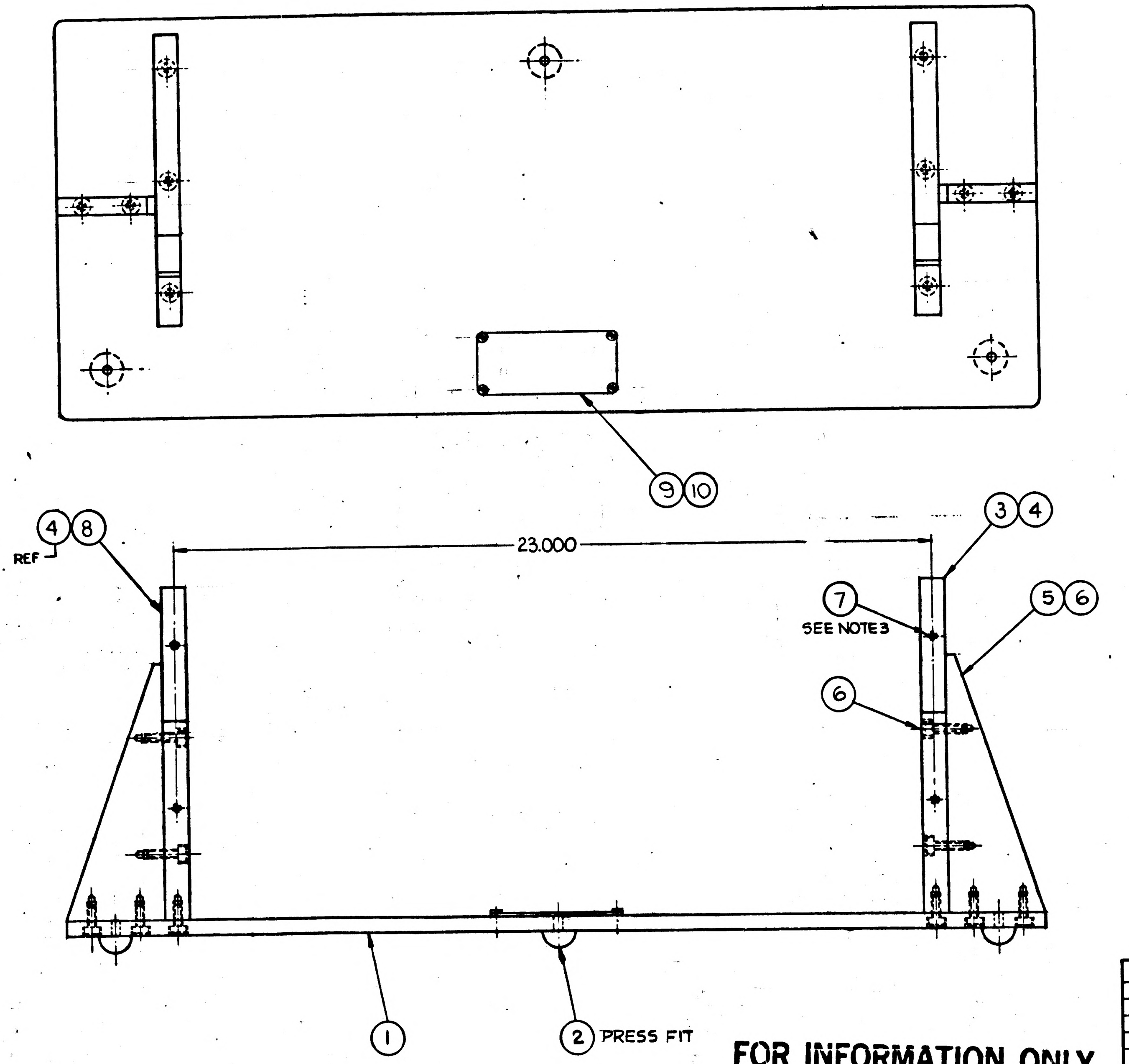
1019741

Ⓜ

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY PER ND1002019.
3.) INSTALL HELI-COIL PER MS33537.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	4		MS24646-1	74455075001		SCREW			
9	1		1019157	16020130170		PLATE, IDENTIFICATION			
8	1		1019149	16020130150		BRACKET, LEFT			
7	4		MS124815			HELI-COIL INSERT (#10-32)			
6	4		1017418-36	74455058036		SCREW, CAP, SOC HD (#1/4-20)			
5	2		1019139	16020130100		BRACKET			
4	10		1017418-34	74455058034		SCREW, CAP, SOC HD (#1/4-20)			
3	1		1019140	16020130110		BRACKET, RIGHT			
2	3		1019138	16020130090		BUTTON			
1	1		1019141	16020130120		BASE			

LIST OF PARTS AND MATERIALS

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

NEXT ASSY	USED ON

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020130080

DRAWN C. Borsody DATE 11-18-63
CHECKED Earl Sayatz 11-19-63
APPROVAL
APPROVAL [illegible] 11-20-63
NASA APPROVAL [illegible] 12-4-63
MIT APPROVAL [illegible] 12/10/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

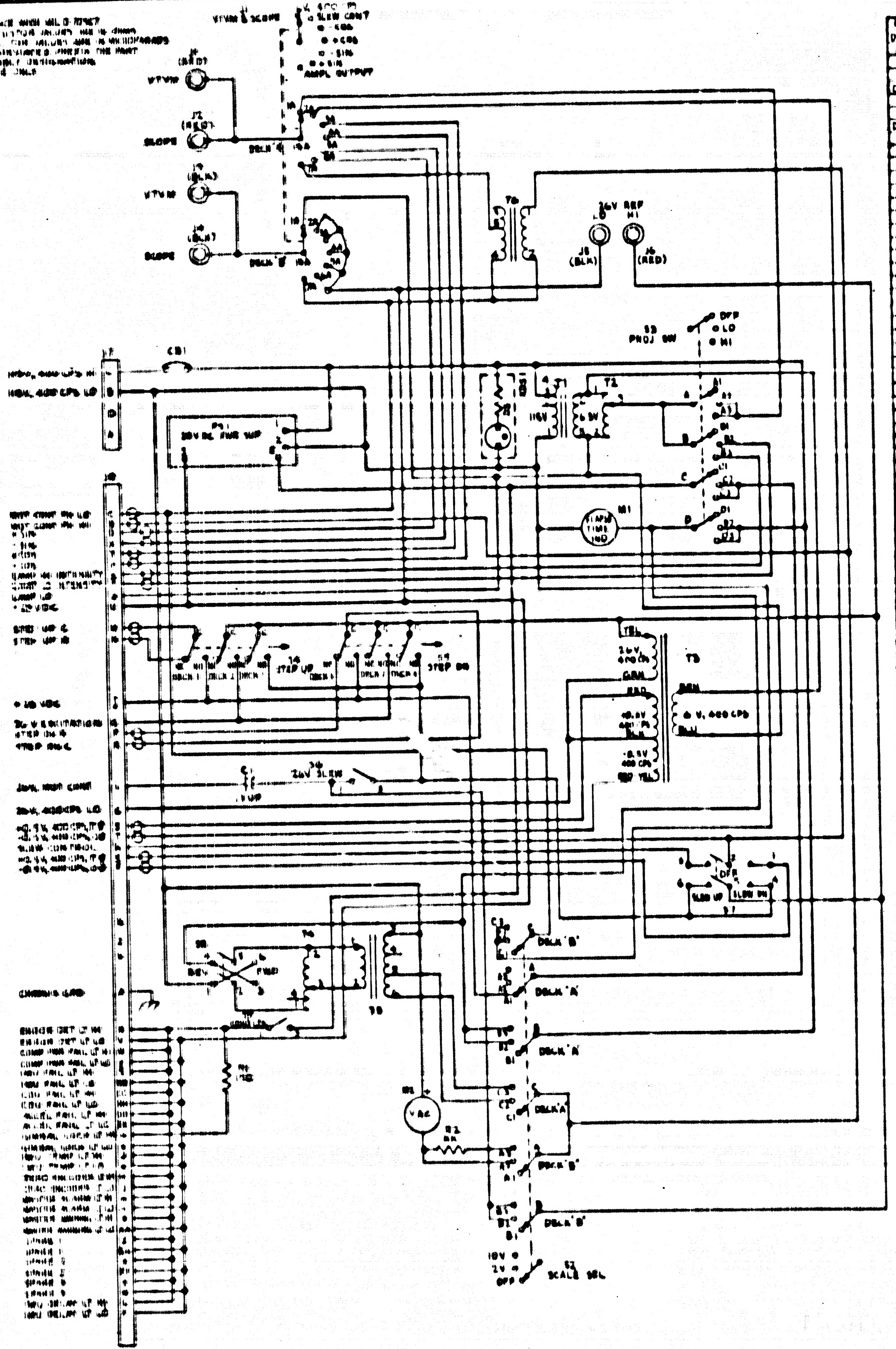
TITLE
MAP & DATA VIEWER
STAND ASSY

CODE IDENT NO.
SIZE D
NASA NUMBER 1019741
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 05027 DATE 10 dec 63

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. SCHEMATIC DRAWING IN ACCORDANCE WITH MIL-D-[illegible]
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE PART DESIGNATION WITH THE ASSEMBLY DESIGNATION
5. [illegible] TO BE FOR REFERENCE ONLY


VTVM & SLOPE
SLEW CONT
AMPL OUTPUT
J1 (RED) VTVM
J2 (RED) SLOPE
J3 (BLK) VTVM
J4 (BLK) SLOPE
DSLK 'A'
DSLK 'B'
T6
26V REF
LO HI
J5 (BLK)
J6 (RED)
S3 PROJ SW
OFF LO HI
CB1
PS1 28V DC PWR SUP
T2
115V
M1 ELAPSED TIME IND
J7
J8
S4 STEP UP
S5 STEP DN
T3
26V 400 CPS
GRN
RED
BLU
YEL
115 V, 400 CPS
C1 .1 UF
S6 26V SLEW
S9 SLEW UP SLEW DN
S8 REV FWD
T4
T5
M2 VAC
R1
R2
S2 SCALE SEL
10V 2V OFF
CHASSIS GND
FBDC 400 CPS HI
FBDC 400 CPS LO

REF DESIG	ITEM	QTY	GOVERNMENT/ NASA NO.	HOLLOMAN PART NO	DESCRIPTION	VALUE	TOL	RATING
C1			[illegible]	68 10000 [illegible]	CAPACITOR	.1 µF	10%	200 V
CB1			PENDING		CIRCUIT BREAKER			
DS1			1017463	68 25700 1901	LAMP, NEON			
J1			1017495-2	68 26000 0802	POST, BINDING (RED)			
J2			1017495-2	68 26000 0802	(RED)			
J3			1017495-1	68 26000 0801	(BLK)			
J4			1017495-1	68 26000 0801	(BLK)			
J5			1017495-1	68 26000 0801	(BLK)			
J6			1017495-2	68 26000 0802	POST, BINDING (RED)			
J7			MS3102A[illegible]		CONNECTOR			
J8			MS3106[illegible]		CONNECTOR			
M1			1006927		INDICATOR, TIME ELAPSE			
M2			1017460-5	68 42100 1105	VOLTMETER, MULTI RANGE			
PS1			1017487		POWER SUPPLY			
R1			RW107101		RESISTOR,	[illegible]		[illegible]
R2			1017460-3	68 42100 1103	RESISTOR, FIXED	[illegible]	1%	1/4W
S1			[illegible]		SWITCH, ROTARY			
S2			1017505-1	[illegible]	, ROTARY			
S3			[illegible]		, ROTARY			
S4			[illegible]		, PUSHBUTTON			
S5			[illegible]		, PUSHBUTTON			
S6			MS35806-27		, SPST			
S7			MS35807-27		, DPDT			
S8			MS35807-23		, DPDT			
S9			MS[illegible]-27		SWITCH, ROTARY			
T1			MS90011-2		TRANSFORMER			
T2			[illegible]	68 47000 7001	TRANSFORMER, VAR			
T3			1011414		TRANSFORMER, PWR			
T4			1017484	68 40005 0801	TRANSFORMER, VAR			
T5			1017462	68 40010 1901	TRANSFORMER, STEP-DN			
T6			1017421	[illegible]	TRANSFORMER, ISOLATION			
XDS1			1017465	68 25100 2101	LAMP, INDICATOR			

REFERENCE DRAWING
1. WIRING DIAGRAM 1010736

FOR INFORMATION ONLY

UNLESS OTHERWISE SPECIFIED

DO NOT SCALE THIS DRAWING

APPLICATION

LIST OF PARTS AND MATERIALS

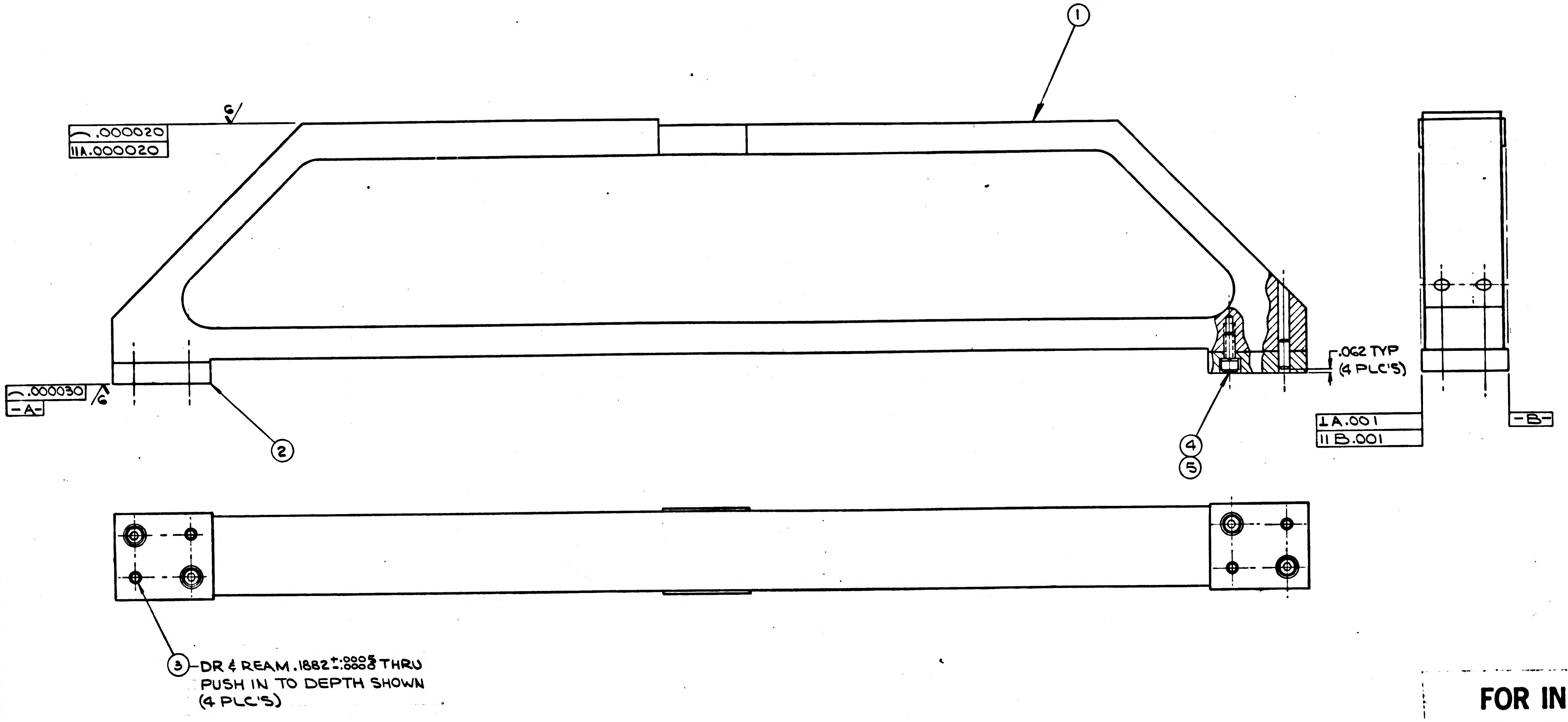
CONTROL PANEL, SWAP AND DATA VIEWER TEST TIP
SCHEMATIC DIAGRAM

E 1010742

1019744

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3- REMOVE BURRS IN ACCORDANCE WITH ND 1002079



③ — DR & REAM .1882 +.0005 −.0000 THRU PUSH IN TO DEPTH SHOWN (4 PLC'S)

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05636 DATE 10 Dec 64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	4		MS35338-81	74439003005		WASHER, LOCK, SPLIT (#10)			
4	4		1017479-24	61406051032		SCR., CAP, SOC. HD (10-32NF-3A × .500 LG)			
3	4		1017424-71	73002505109		DOWEL, PIN (.1875 DIA × .500 LG)			
2	2		1019147	03386900701		PLATE			
1	1		1019117	03386900673		BAR, LEVEL UNIT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019737	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900137
DRAWN Rindlner DATE 11-19-63
CHECKED 11-19-63
APPROVAL
APPROVAL 11-19-63
NASA APPROVAL
12-9-63
MIT APPROVAL 12/10/63

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BAR ASSEMBLY

CODE IDENT NO.
SIZE D
NASA NUMBER 1019744
SCALE 1:1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

1019744

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

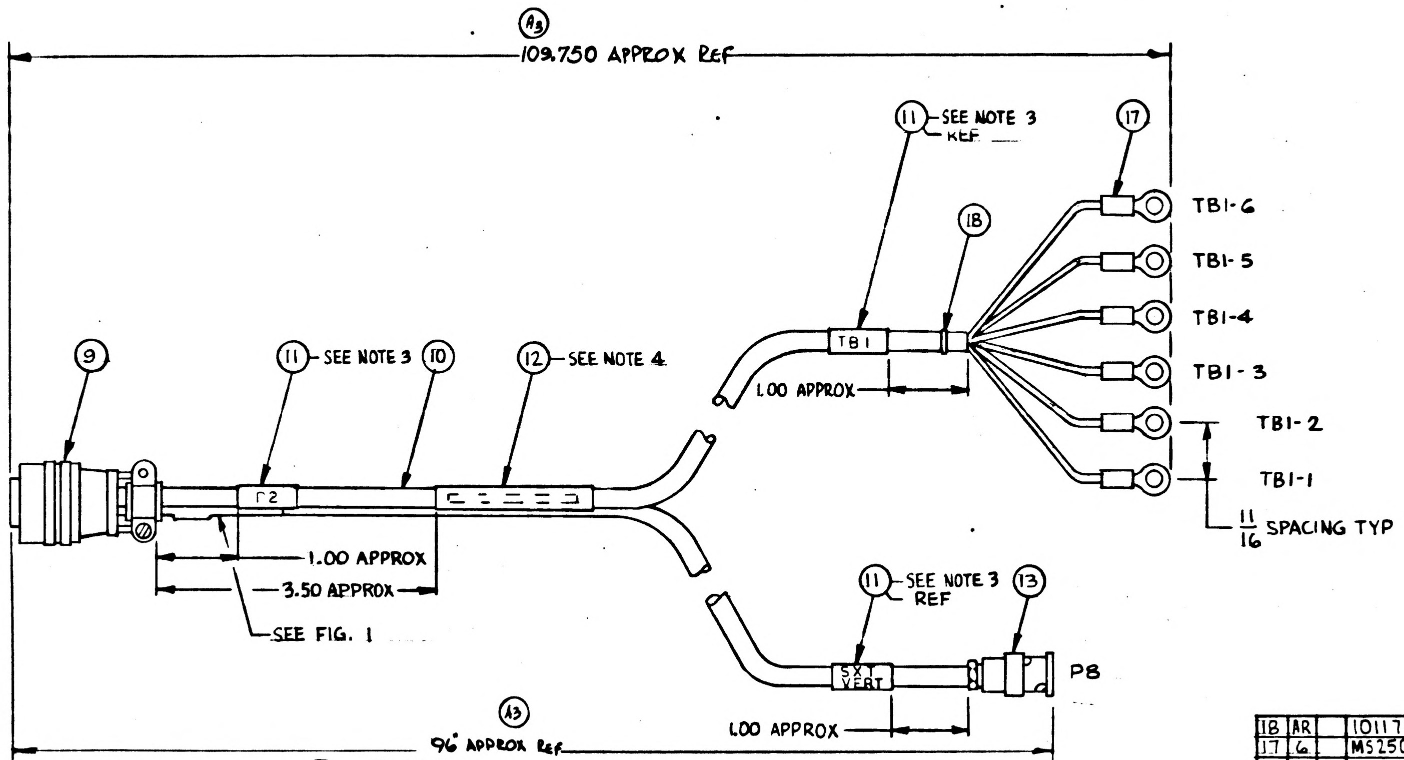
1019745 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM AND CABLE NO. (W1) PER ND 1002019.
(A4) 5. MIL-I-631, TYPE F, FORM U, GRADE C, CLASS 1, CATEGORY 1 AWG 1/4, COLOR-BLK
6. WIRE TO CONFORM WITH ND 1002181, TYPE I, CLASS 1, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
7. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	3	RED	108"		P2-A	TB1-1	
2	6	BLU	108"		P2-B	TB1-2	
3	5	GRN	108"		P2-E	TB1-3	
4	7	WHT	108"		P2-F	TB1-4	
5	4	ORN	108"		P2-D	TB1-5	
6	1	BLK	108"		P2-G	TB1-6	
7	8	BLK/CLEAR	96"		P2-C	P8	SEE FIG. 1
8	2	BRN	3"		P2-H	SHLD COND 7	SEE FIG. 1

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER ECP NO 107454 TDRR 13478 DATE 10/20/64	8-13-64 EJR.	B.W. 9-14-64


A3
109.750 APPROX REF
9
11 SEE NOTE 3
10
12 SEE NOTE 4
P2
1.00 APPROX
3.50 APPROX
SEE FIG. 1
11 SEE NOTE 3 REF
17
18
TB1
1.00 APPROX
TB1-6
TB1-5
TB1-4
TB1-3
TB1-2
TB1-1
11/16 SPACING TYP
11 SEE NOTE 3 REF
13
SXT VERT
P8
1.00 APPROX
A3
96 APPROX REF

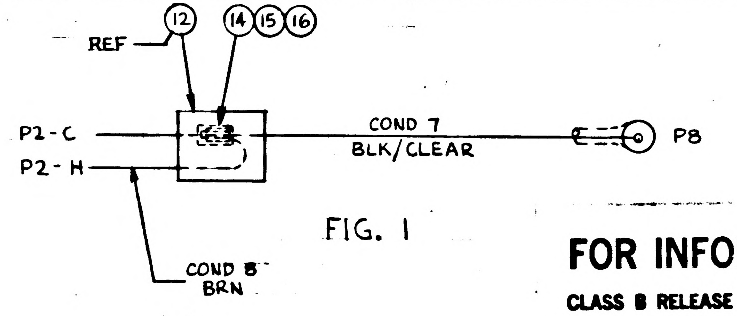

REF
12
14 15 16
P2-C
P2-H
COND 7
BLK/CLEAR
P8
COND 8
BRN

FIG. 1

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

REFERENCE DRAWING
INTERCONNECTION DIAGRAM 1019740

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	AR		1011753			TAPE LACING & TYING			
17	6		MS25036-3			TERMINAL, INSULATED			
16	1		1010490-140	60025035007		INSULATION SLEEVING (5/8" LG)			
15	1		1000242-14	74094045007		FERRULE (OUTER)			
14	1		1000243-15	74094045029		FERRULE (INNER)			
13	1	A2	MS35168-88E			CONNECTOR, PLUG			
12	2		1015865-464	60025035054		INSULATION SLEEVING (2" LG)			
11	3		1015865-164	60025035054		INSULATION SLEEVING (3/4" LG)			
10	105"		SEE NOTE 5	60025050008		INSULATION SLEEVING			
9	1		MS3126F-12-10P			CONNECTOR, PLUG			
8	96"	A1	RG-58C/U MIL-C-17/28			CABLE, RADIO FREQ. COAXIAL (BLK/CLEAR) (SEE NOTE 7)			
7	108"		SEE NOTE 6			WIRE, ELECTRICAL (WHT) (AWG 22)			
6	108"					(BLU) (AWG 20)			
5	108"					(GRN) (AWG 20)			
4	108"					(ORN) (AWG 20)			
3	108"					(RED) (AWG 20)			
2	3"					(BRN) (AWG 20)			
1	108"		SEE NOTE 6			WIRE, ELECTRICAL (BLK) (AWG 20)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900138
DRAWN J. MARGIOTTA DATE 12-17-63
CHECKED J. ANGERTON 1-7-64
APPROVAL
APPROVAL 1-23-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W1)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019745
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

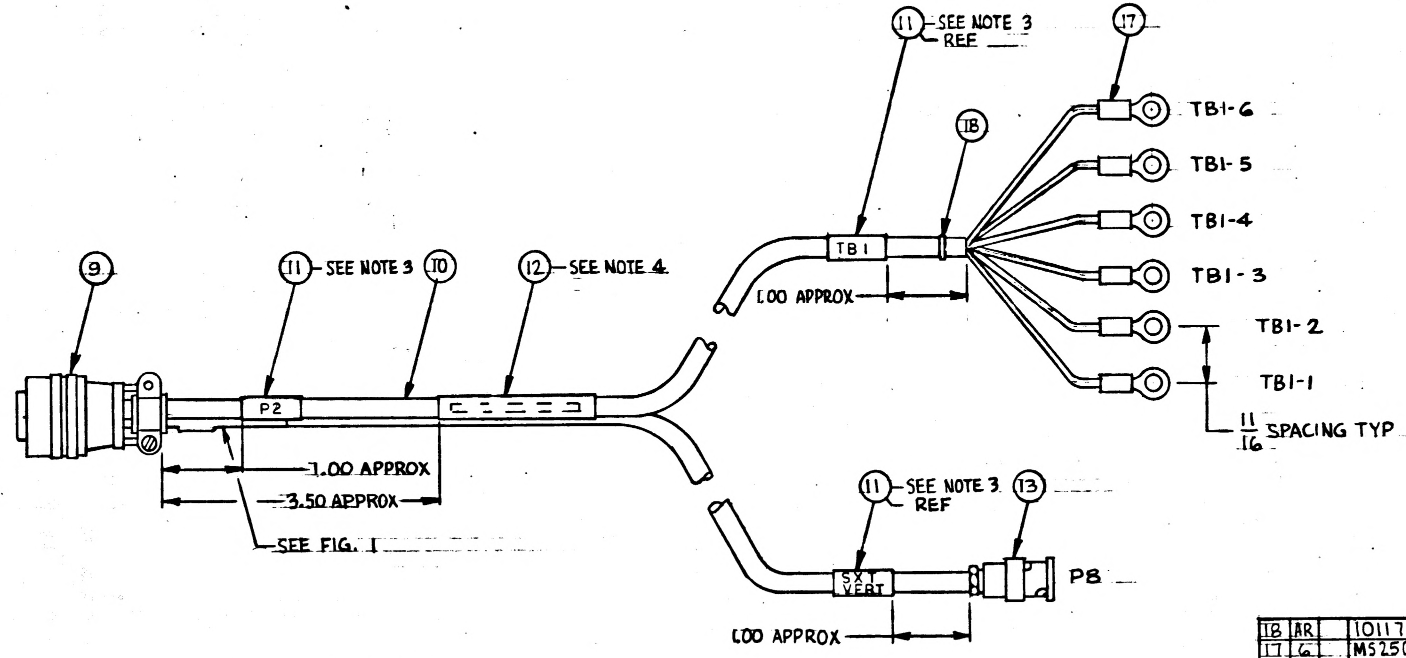
1019745 A

1019745

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM AND CABLE NO. (W1) PER ND 1002019.
5. MIL-I-631C, TYPE F, FORM U, GRADE C, CLASS 1, CATEGORY 1 AWG 1/4, COLOR-BLK
6. WIRE TO CONFORM WITH ND 1002181, TYPE I, CLASS I, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
7. FOR SHIELDED WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	3	RED	108"		P2-A	TB1-1	
2	6	BLU	108"		P2-B	TB1-2	
3	5	GRN	108"		P2-E	TB1-3	
4	7	WHT	108"		P2-F	TB1-4	
5	4	ORN	108"		P2-D	TB1-5	
6	1	BLK	108"		P2-G	TB1-6	
7	8	BLK/CLEAR	96"		P2-C	P8	SEE FIG. 1
8	2	BRN	3"		P2-H	SHLD COND 7	SEE FIG. 1



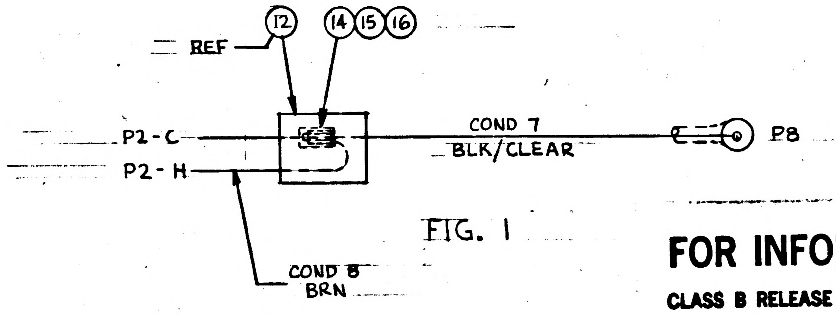


FIG. 1

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 **DATE** 2-4-64

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	AR		1011753			TAPE LACING & TYING			
17	6		MS25036-3			TERMINAL, INSULATED			
16	1		1010490-140	60025035007		INSULATION SLEEVING (5/8" LG)			
15	1		1000242-14	74094045007		FERRULE (OUTER)			
14	1		1000243-15	74094045029		FERRULE (INNER)			
13	1		UG-88/U			CONNECTOR, PLUG			
12	2		1015865-464	60025035054		INSULATION SLEEVING (2" LG)			
11	3		1015865-164	60025035054		INSULATION SLEEVING (3/4" LG)			
10	105"		SEE NOTE 5	60025050008		INSULATION SLEEVING			
9	1		MS3126F-12-10P			CONNECTOR, PLUG			
8	96"		RG-58A/U			CABLE, RADIO FREQ. COAXIAL (BLK/CLEAR) (SEE NOTE 7)			
7	108"		SEE NOTE 6			WIRE, ELECTRICAL (WHT) (AWG 22)			
6	108"					(BLU) (AWG 20)			
5	108"					(GRN) (AWG 20)			
4	108"					(ORN) (AWG 20)			
3	108"					(RED) (AWG 20)			
2	3"					(BRN) (AWG 20)			
1	108"		SEE NOTE 6			WIRE, ELECTRICAL (BLK) (AWG 20)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900138
DRAWN L. MARGIOTTA DATE 12-17-63
CHECKED J. ANDERSON 1-7-64
APPROVAL
APPROVAL 1-23-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
(W1)

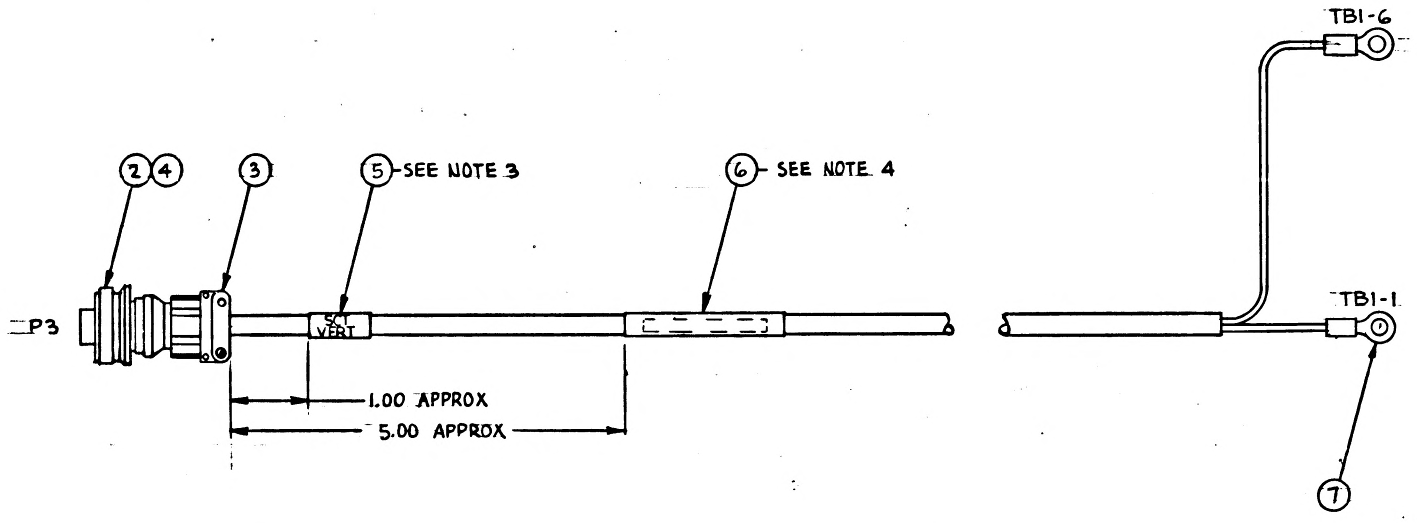
CODE IDENT NO.
SIZE D
NASA NUMBER 1019745
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019746

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM AND CABLE NO. (W2) PER ND 1002019

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK	130"		P3-B	TB1-1	
		WHT			P3-C	TB1-6	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 1-4-64

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	2		MS25036-3			TERMINAL, INSULATED			
6	1		1015865-464	6002503 5054		INSULATION SLEEVING (2" LG)			
5	1		1015865-164	6002503 5054		INSULATION SLEEVING (3/4" LG)			
4	2		1010490-116	6002503 5004		INSULATION SLEEVING (1/2" LG)			
3	1		MS3057-4			CLAMP, CABLE			
2	1		MS3106A-10SL-3S			CONNECTOR, PLUG			
1	130"		CD-02LGF(2/20)0230			CABLE ELECTRICAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900139
DRAWN J. MARGIOTTA DATE 12-13-63
CHECKED J ANDERSON 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 1/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
(W 2)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019746
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET OF

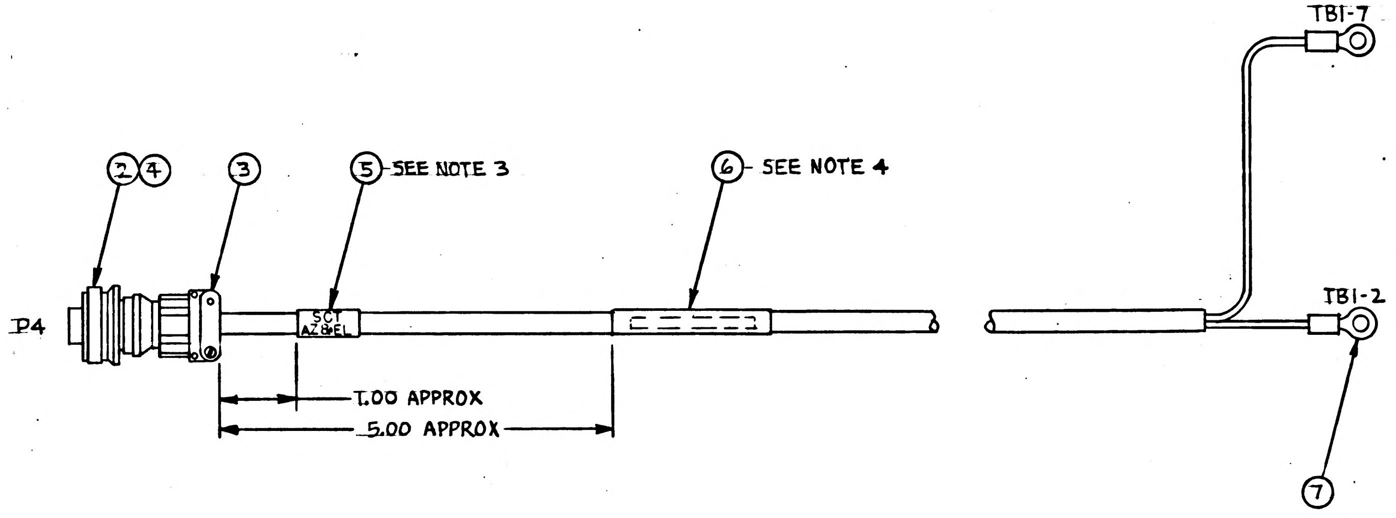
1019746

1019747

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM AND CABLE NO. (W2) PER ND 1002019.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK	130"		P4-B	TB1-2	
		WHT			P4-C	TB1-7	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	2		MS25036-3			TERMINAL, INSULATED			
6	1		1015865-464	60025035054		INSULATION SLEEVING (2" LG)			
5	1		1015865-164	60025035054		INSULATION SLEEVING (3/4" LG)			
4	2		1010490-116	60025035004		INSULATION SLEEVING (1/2" LG)			
3	1		MS3057-4			CLAMP, CABLE			
2	1		MS3106A-10SL-3S			CONNECTOR, PLUG			
1	130"		CD-02LGF(2/20)0230			CABLE, ELECTRICAL			

LIST OF PARTS AND MATERIALS

REFERENCE DRAWING:
1. INTERCONNECTION DIAGRAM 1019740

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900140
DRAWN J. MARGIOTTA DATE 12-13-63
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 1/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W3)

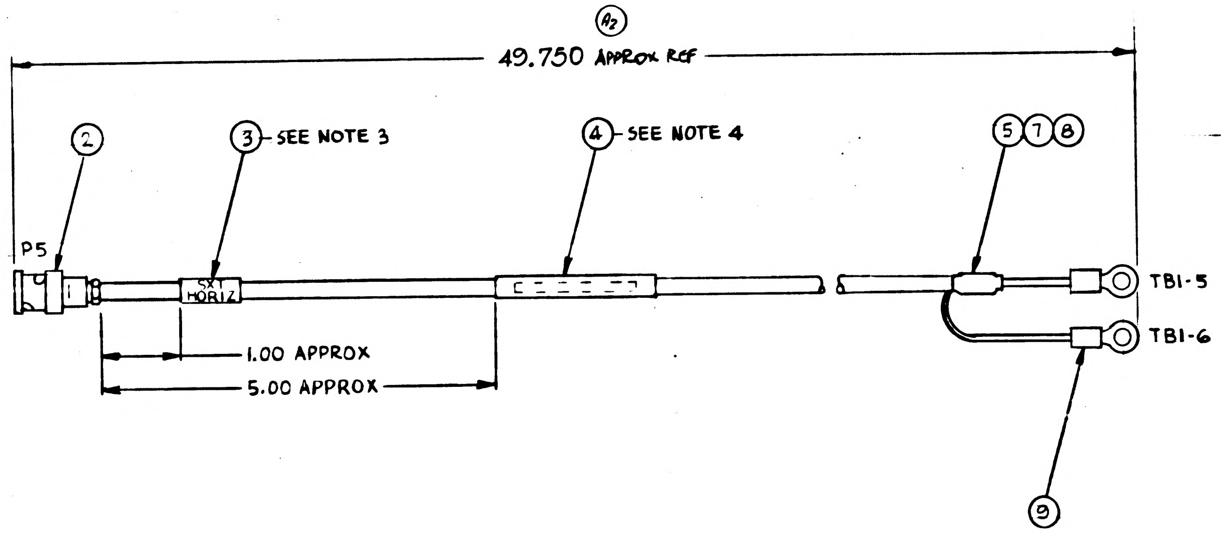
CODE IDENT NO.
SIZE D
NASA NUMBER 1019747
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

1019748 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
(M) A_2		REVISED PER ECP NO 106580 TDRR 13477 DATE 10/20/64	9-12-64 E.J.R.	B.W. 9-14-64 10/20

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFRS SYM AND CABLE NO. (W4) PER ND 1002019.
5. FOR SHIELDED WIRES, THE OUTER JACKET PRECEDES THE SLASH FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
6. WIRE TO CONFORM WITH ND 1002181 TYPE I, CLASS 1, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	1	BLK/CLEAR	48"		P5	TB1-5	
2	6	BRN	6"		SHLD COND 1	TB1-6	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2		MS25036-3			TERMINAL, INSULATED			
8	1		1000242-14	74094045007		FERRULE (OUTER)			
7	1		1000243-15	74094045029		FERRULE (INNER)			
6	6"		SEE NOTE 6			WIRE, ELECTRIAL (BRN) (AWG 22)			
5	1		1010490-140	30025035007		INSULATION, SLEEVING (5/8" LG)			
4	1		1015865-464	60025035054		INSULATION, SLEEVING (2" LG)			
3	1		1015865-164	60025035054		INSULATION, SLEEVING (3/4" LG)			
2	1		MS35168-88E			CONNECTOR, PLUG			
1	48"		RG-58C/U MIL-C-17/28			CABLE, RADIO FREQ. COAXIAL (BLK/CLEAR) (SEE NOTE 5)			

A_2

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900141
DRAWN J. MARGIOTTA DATE 12-13-64
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 1/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W 4)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019748
SCALE ~
WEIGHT ~ CALC ACTUAL
SHEET 1 OF 1

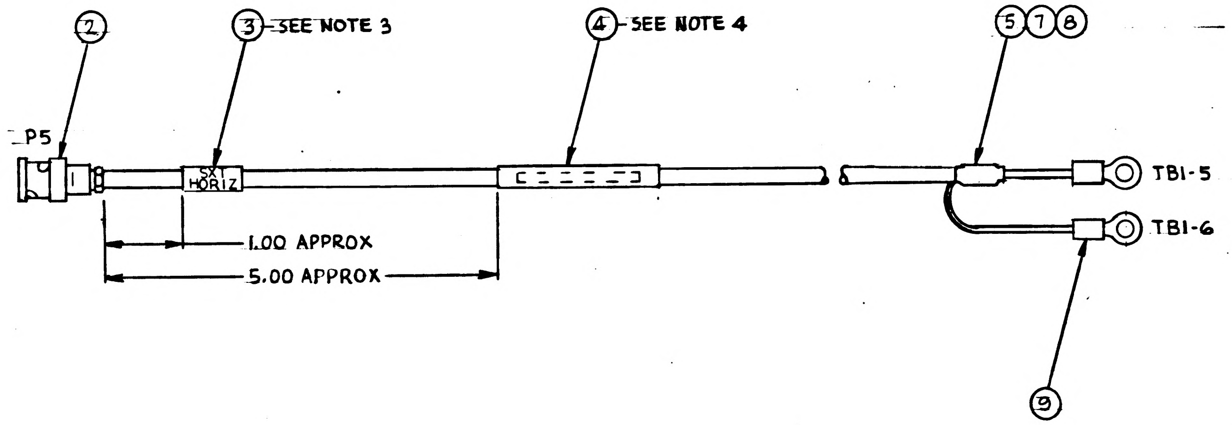
1019748A

1019748

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFRS SYM AND CABLE NO. (W4) PER ND 1002019.
5. FOR SHIELDED WIRES, THE OUTER JACKET PRECEDES THE SLASH FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
6. WIRE TO CONFORM WITH ND 1002181 TYPE I, CLASS 1, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	1	BLK/CLEAR	48"		P5	TB1-5	
2	6	BRN	6"		SHLD COND 1	TB1-6	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2		MS25036-3			TERMINAL, INSULATED			
8	1		100242-14	74094045007		FERRULE (OUTER)			
7	1		1000243-15	74094045029		FERRULE (INNER)			
6	3"		SEE NOTE 6			WIRE, ELECTRIAL (BRN) (AWG 22)			
5	1		1010490-140	60025035007		INSULATION, SLEEVING (5/8" LG)			
4	1		1015865-464	60025035054		INSULATION, SLEEVING (2" LG)			
3	1		1015865-164	60025035054		INSULATION, SLEEVING (3/4" LG)			
2	1		UG-88/U			CONNECTOR, PLUG			
1	48"		RG-58A/U			CABLE, RADIO FREQ. COAXIAL (BLK/CLEAR) (SEE NOTE 5)			

APPLICATION	
NEXT ASSY	USED ON
1016910	1016910

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900141

DRAWN J. MARGIOTTA DATE 12-13-64
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL D. Hazel 1/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
(W 4)

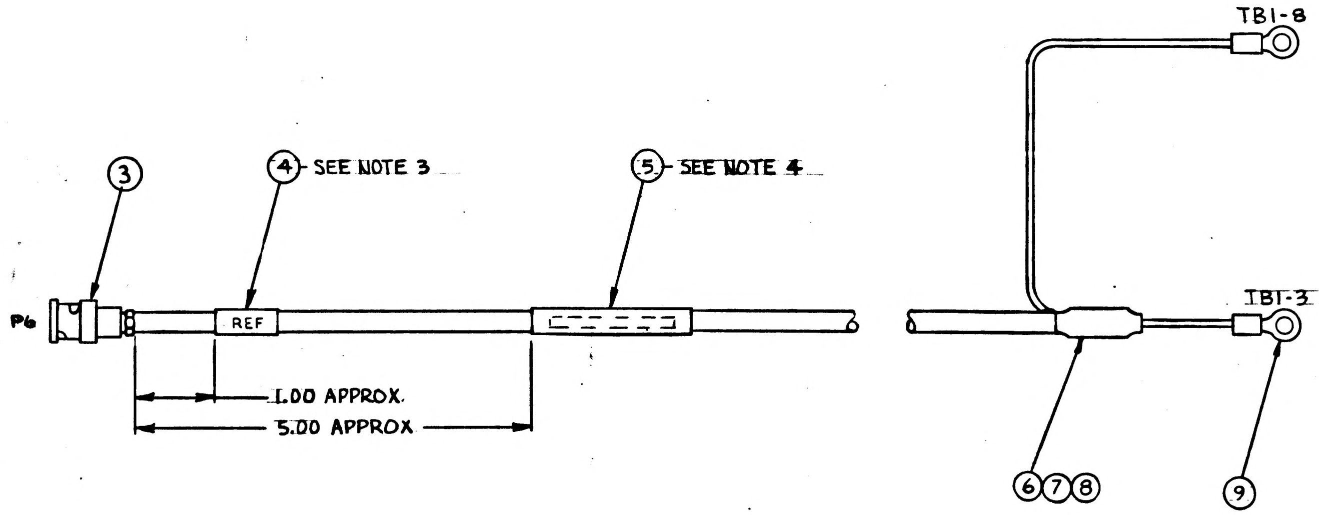
CODE IDENT NO.
SIZE D
NASA NUMBER 1019748
SCALE ~
WEIGHT ~ CALC ACTUAL
SHEET 1 OF 1

1019749

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO, REV LTR, MFR SYM AND CABLE NO. (W5) PER ND 1002019
5. FOR SHIELDED WIRES, THE OUTER JACKET PRECEDES THE SLASH FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR
6. WIRE TO CONFORM WITH ND1002181 TYPE I, CLASS 1, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS)

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK/CLEAR			P6	TB1-3	
2	2	BRN			SHLD COND 1	TB1-8	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 **DATE** 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2		MS25036-3			TERMINAL, INSULATED			
8	1		1000242-14	74094045007		FERRULE (OUTER)			
7	1		1000243-15	74094045029		FERRULE (INNER)			
6	1		1010490-140	60025035007		INSULATION, SLEEVING (5/8 LG)			
5	1		1015865-464	60025035054		INSULATION, SLEEVING (2" LG)			
4	1		1015865-164	60025035054		INSULATION, SLEEVING (3/4" LG)			
3	1		UG-88U			CONNECTOR, PLUG			
2	6"		SEE NOTE 6			WIRE, ELECT. (BRN) (AWG 22)			
1	96"		RG-58A/U			CABLE, RADIO FREQ, COAXIAL (BLK/CLEAR) (SEE NOTE 5)			

LIST OF PARTS AND MATERIALS

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900142
DRAWN J. MARGIOTTA DATE 12-17-63
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-13-64
MIT APPROVAL 1/24/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W 5)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019749
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

MASTER

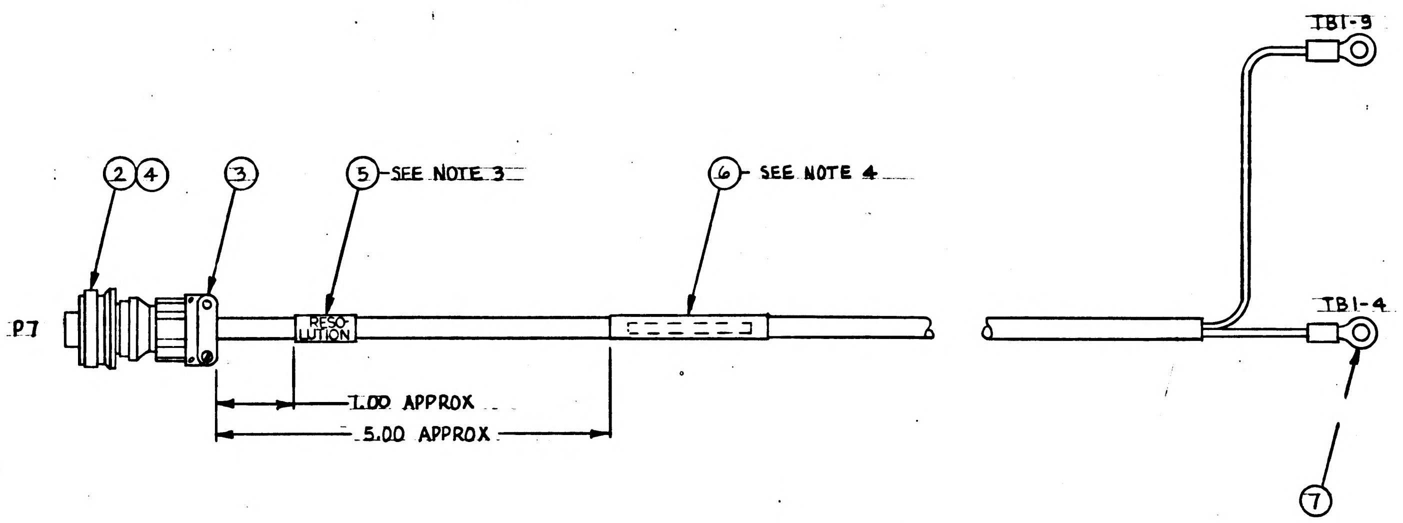
1019749

1019750

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFR SYM AND CABLE NO. (W6) PER ND 1002019

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
I	1	BLK	54"		P7-B	TB1-4	
		WHT			P7-C	TB1-9	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. D6140 DATE 2-4-64

REFERENCE DRAWING
1. INTERCONNECTION DIAGRAM 1019740

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	2		MS25036-3			TERMINAL, INSULATED			
6	1		1015865-464	6002503 5054		INSULATION SLEEVING (2" LG)			
5	1		1015865-164	6002503 5054		INSULATION SLEEVING (3/4" LG)			
4	2		1010490-116	6002503 5004		INSULATION SLEEVING (1/2" LG)			
3	1		MS3057-4			CLAMP, CABLE			
2	1		MS3106A-10SL-3S			CONNECTOR, PLUG			
1	54"		CO-02LGF(2/20)0230			CABLE, ELECTRICAL			

LIST OF PARTS AND MATERIALS

APPLICATION	
NEXT ASSY	USED ON
1016910	1016910

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900143
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. ANDERSON 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 1/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W6)

CODE IDENT NO. SIZE D NASA NUMBER 1019750
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

1019750

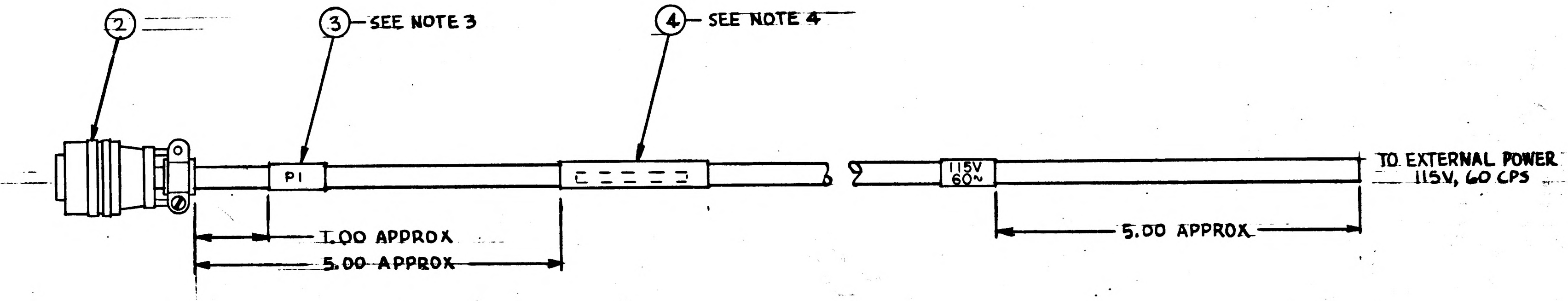
1019751 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFRS SYM AND CABLE NO. (W7) PER ND 1002019

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK	180"	—	P1-B	—	
		WHT			P1-C	—	
		GRN			P1-A	—	

REVISIONS 06140

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	A-3	ITEM NO. 1 WAS CO-02MGF(3(16)[illegible]	[illegible]	
		TDRR 07168	2/24/64	



FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		1015865-460	60025035056		INSULATION SLEEVING (7" LG)			
3	2		1015865-160	60025035056		INSULATION SLEEVING (2 1/2" LG)			
2	1		MS3126F-16-8S			CONNECTOR, PLUG			
1	180"		CO-03MGF(3(16)[illegible]			CABLE, ELECTRICAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900144
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. [illegible] 1-7-64
APPROVAL R. Ferreri 2-27-64
APPROVAL [illegible] 1-24-64
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL [illegible] 2/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W7)

CODE IDENT NO. | SIZE D | NASA NUMBER 1019751
SCALE ~ | WEIGHT ~ CALC ACTUAL | SHEET 1 OF 1

REFERENCE DRAWING:
1. INTERCONNECTION DIAGRAM 1019740

MASTER

INCHES 0 1 2 PHOTOGRAPHING SCALE ONLY

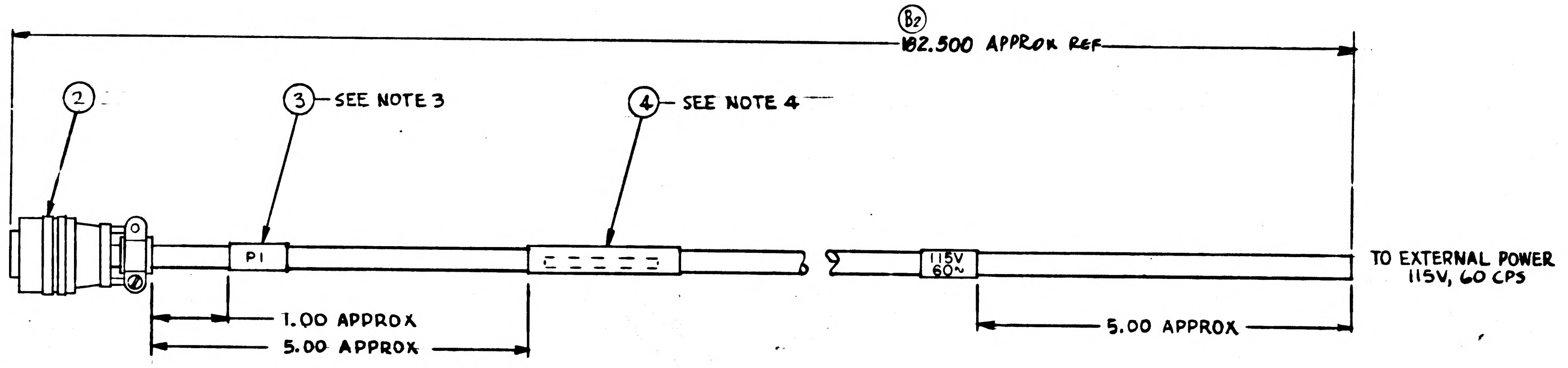
B 1019751

REVISIONS 06140				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	A-3	ITEM NO. 1 WAS CO-02MGF(3/16)035 TDRR 07168	2-26-64 3/18/64	
B3		REVISED PER ECP NO. 10058I TDRR 13475 DATE 10/2/[illegible]		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFRS SYM AND CABLE NO. (W7) PER ND 1002019

CONDUCTOR							
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK	180"	—	P1-B	—	
		WHT			P1-C	—	
		GRN			P1-A	—	

(B3)



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

REFERENCE DRAWING:
1. INTERCONNECTION DIAGRAM 1019740

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		1015865-460	60025035056		INSULATION SLEEVING (2" LG)			
3	2		1015865-160	60025035056		INSULATION SLEEVING (3/4" LG)			
2	1		MS3126F-16-8S			CONNECTOR, PLUG			
1 (B1)	180"		CO-03MGF(3/16)035			CABLE, ELECTRICAL MIL-C-3432			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900144
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL R. [illegible] 2-27-64
APPROVAL [illegible] 1-24-64
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL [illegible] 1/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W7)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019751
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

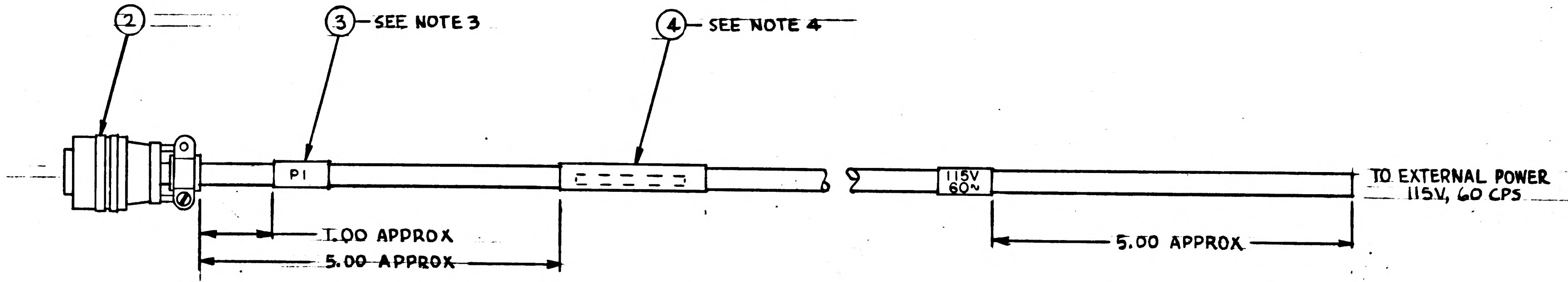
1019751 B

1019751

REVISIONS 06140				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PT NO., REV LTR, MFRS SYM AND CABLE NO. (W7) PER ND 1002019

NO.	ITEM NO.	CONDUCTOR COLOR	APPROX LENGTH	ROUTE	FROM COMPONENT	TO COMPONENT	REFERENCE
1	1	BLK	—	—	P1-B	—	
		WHT	—	—	P1-C	—	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		1015865-460	60025035056		INSULATION SLEEVING (2" LG)			
3	2		1015865-160	60025035056		INSULATION SLEEVING (3/4" LG)			
2	1		MS3126F-16-8S			CONNECTOR, PLUG			
1	180"		CO-02MGF(2/16)0395	60015088005		CABLE, ELECTRICAL			

LIST OF PARTS AND MATERIALS

REFERENCE DRAWING:
1. INTERCONNECTION DIAGRAM 1019740

MASTER

1016910	1016910
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900144
DRAWN J. MARGIOTTA DATE 12-18-63
CHECKED J. ADLERSTEIN 1-7-64
APPROVAL
APPROVAL 1-24-64
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W7)

CODE IDENT NO.
SIZE D
NASA NUMBER 1019751
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

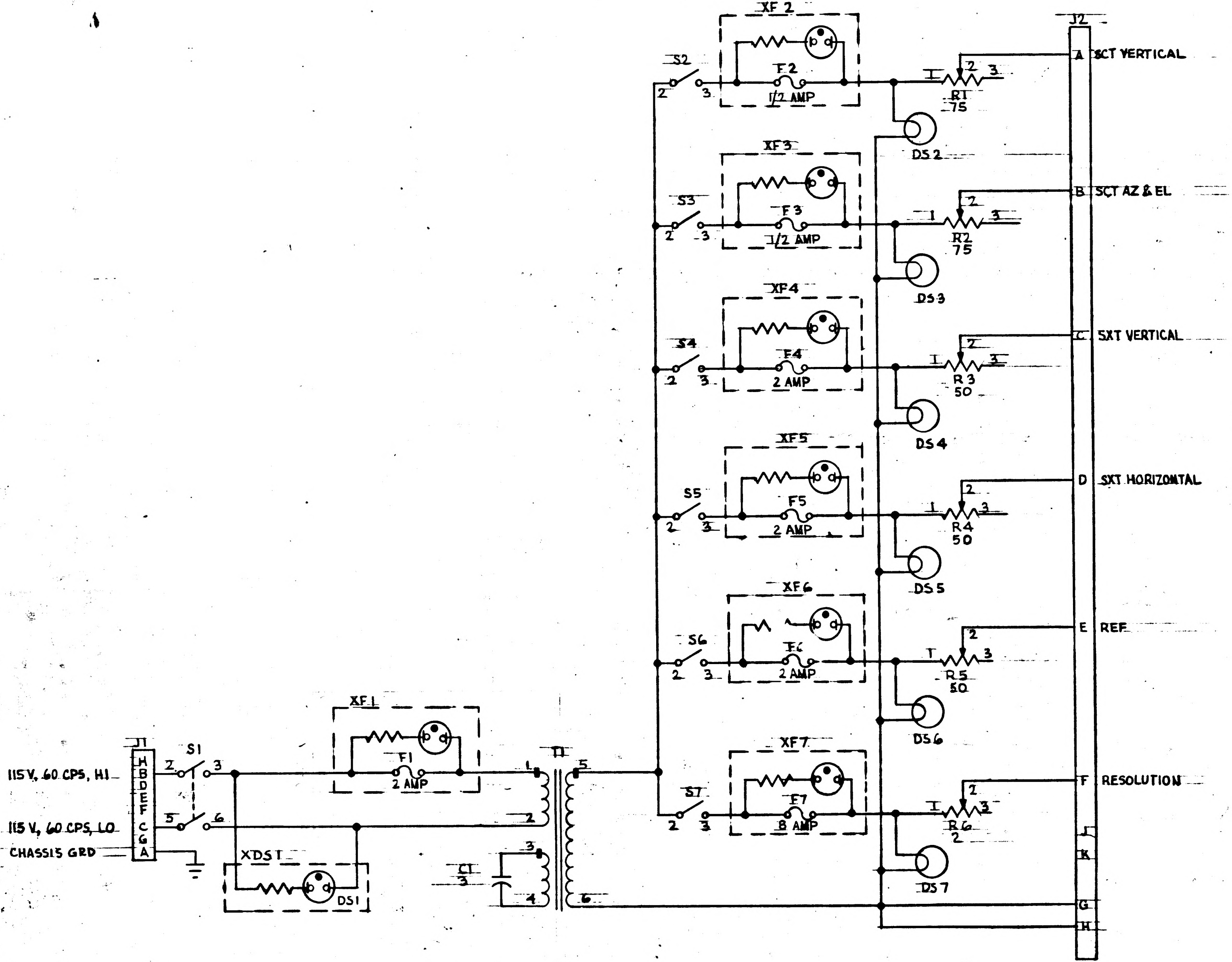
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. PARTS LIST TO BE FOR REFERENCE ONLY

1019754 A

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1017477	03386900626	CAPACITOR	3 UF	±20%	600V
DS1			1017463	68257001901	LAMP GLOW (NEON)			
DS2			1017511-1	68257000701	INCANDESCENT			
DS3								
DS4								
DS5								
DS6								
DS7			1017511-1	68257000701	LAMP INCANDESCENT			
F1			MS90078-26		FUSE, CARTRIDGE, 3AG-2A			2 AMP
F2			MS90079-18	68151000917				1/2 AMP
F3			MS90079-18	68151000917				1/2 AMP
F4			MS90078-26					2 AMP
F5			MS90078-26					2 AMP
F6			MS90078-26					2 AMP
F7			MS90079-23	68151000933	FUSE, CARTRIDGE			8 AMP
J1			MS3122E-16-8P		CONNECTOR			
J2			MS3122E-12-10S		CONNECTOR			
R1			1017498	03386900668	RESISTOR, WW	75	±10%	2W
R2			1017498	03386900668		75	±10%	2W
R3			1016003-10			50	±10%	25W
R4			1016003-10			50	±10%	25W
R5			1016003-10			50	±10%	25W
R6			1017500	03386900670	RESISTOR, WW	2	±10%	50W
S1			MS25307-22		SWITCH TOGGLE, DPST			
S2			MS25306-22		SPST			
S3								
S4								
S5								
S6								
S7			MS25306-22		SWITCH TOGGLE SPST			
T1			1017475	03386900625	TRANSFORMER			
XDS1			1017465	68251002105	LAMP HOLDER			
XF1			PENDING	68152001406	FUSE HOLDER			
XF2								
XF3								
XF4								
XF5								
XF6								
XF7			PENDING	68152001406	FUSE HOLDER			

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		R3 R4 & R5 WAS 1017499 F4 F5 & F6 WAS MS90077-20 ADDED CHASSIS GRD TO J1-A	2-11-64 12-4-63	
		TDRR 07177	3/24/64	


XF2
S2
2
3
F2
1/2 AMP
1
2
3
R1
75
DS2
XF3
S3
F3
1/2 AMP
R2
75
DS3
XF4
S4
F4
2 AMP
R3
50
DS4
XF5
S5
F5
2 AMP
R4
50
DS5
XF6
S6
F6
2 AMP
R5
50
DS6
XF7
S7
F7
8 AMP
R6
2
DS7
J2
A SCT VERTICAL
B SCT AZ & EL
C SXT VERTICAL
D SXT HORIZONTAL
E REF.
F RESOLUTION
K
G
H
115V, 60 CPS, HI
115 V, 60 CPS, LO
CHASSIS GRD
J1
H
B
D
E
F
C
G
A
S1
2
3
5
6
XF1
F1
2 AMP
XDS1
DS1
T1
1
2
3
4
5
6
C1
3

REFERENCE DRAWING
1. WIRING DIAGRAM 1019757

MASTER

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019717	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 02004 0010
DRAWN LINGIOTTA DATE 12-9-63
CHECKED J. ALLOPSTEIN 1-15-64
APPROVAL
APPROVAL
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE CONTROL BOX
SCHEMATIC DIAGRAM

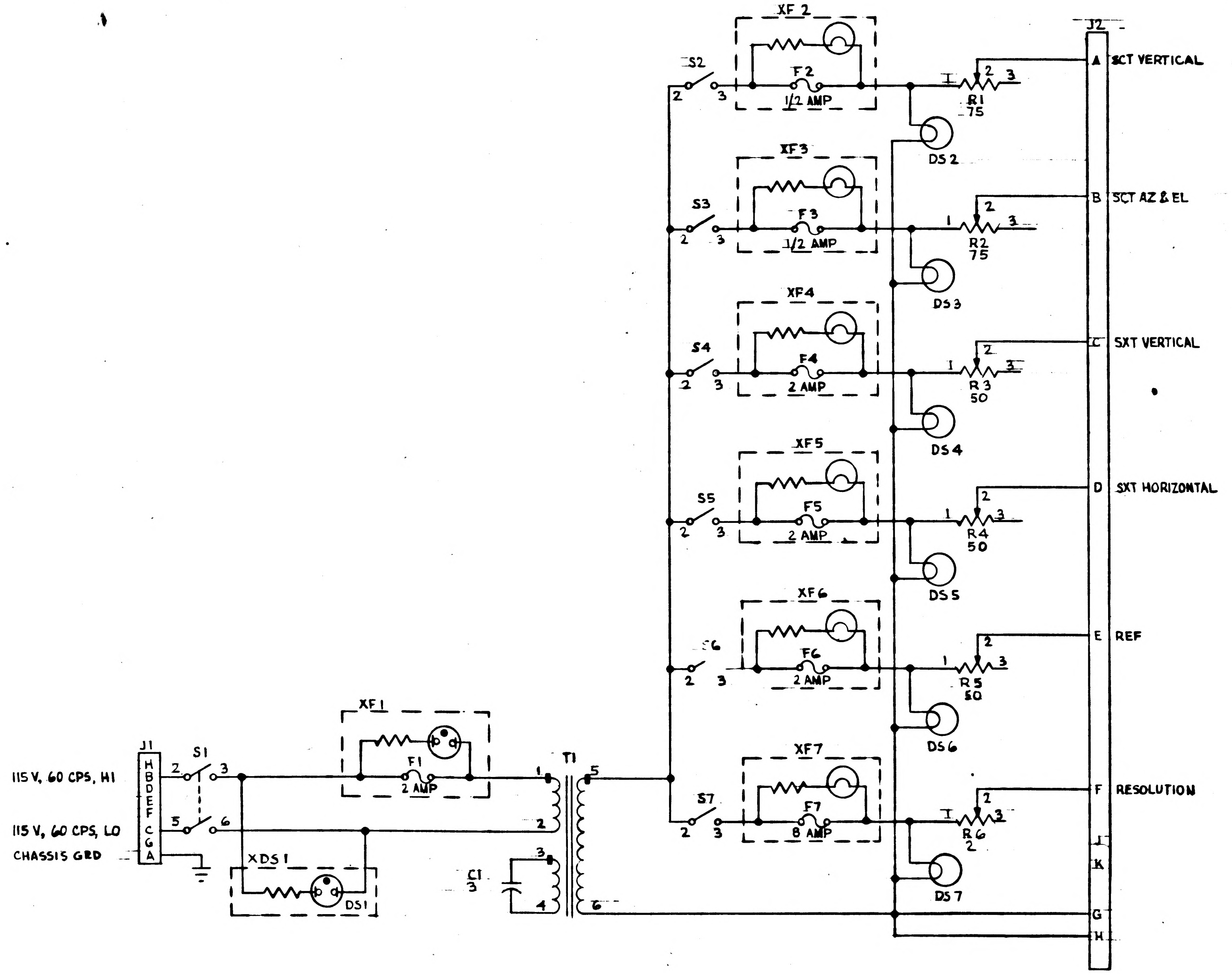
CODE IDENT NO.
SIZE E
NASA NUMBER 1019754
SCALE ~ WEIGHT ~ CALC ACTUAL SHEET 1 OF 1

1019754 B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. PARTS LIST TO BE FOR REFERENCE ONLY

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		R3 R4 & R5 WAS 1017499 F4 F5 & F6 WAS MS9007-20 ADDED CHASSIS GND TO J1-A TDRR 07177	[illegible]	[illegible]
B		REVISED PER EEP 106215 TDRR 10064 DATE 6-9-64	5/20/64	5/22/6

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1017477	03386900626	CAPACITOR	3 UF	±20%	600V
DS1			1017463	6825700190	LAMP GLOW (NEON)			
DS2			1001659-1	6825700 0701	INCANDESCENT			
DS3			↑	↑	↑			
DS4								
DS5								
DS6			↓	↓	↓			
DS7			1001659-1	6825700 0701	LAMP INCANDESCENT			
F1			MS90078-26		FUSE, CARTRIDGE, 3AG-2A			2 AMP
F2			MS90079-18	68151000917	↑			1/2 AMP
F3			MS90079-18	68151000917				1/2 AMP
F4			MS90078-26					2 AMP
F5			MS90078-26					2 AMP
F6			MS90078-26		↓			2 AMP
F7			MS90079-23	68151000933	FUSE, CARTRIDGE			8 AMP
J1			MS3122E-16-8P		CONNECTOR			
J2			MS3122E-12-10S		CONNECTOR			
R1			1017498	03386900668	RESISTOR, WW	75	±10%	2W
R2			1017498	03386900668	↑	75	±10%	2W
R3			1016003-10			50	±10%	25W
R4			1016003-10			50	±10%	25W
R5			1016003-10		↓	50	±10%	25W
R6			1017500	03386900670	RESISTOR, WW	2	±10%	50W
S1			MS25307-22		SWITCH TOGGLE, DPST			
S2			MS25306-22		↑ SPST			
S3			↑		↑			
S4								
S5								
S6			↓		↓ ↓			
S7			MS25306-22		SWITCH TOGGLE SPST			
T1			1017475	03386900625	TRANSFORMER			
XDS1			1017465	68251002105	LAMP HOLDER			
XF1			1001667-2	6815200 14C2	FUSE HOLDER			
XF2			↑ -6	↑ 1406	↑			
XF3			-6	1406				
XF4			-6	1406				
XF5			-6	1406				
XF6			↓ -6	↓ 1406	↓			
XF7			1001667-6	6815200 1406	FUSE HOLDER			


XF 2
S2
2 3
F2
1/2 AMP
R1
75
1 2 3
DS2
J2
A SCT VERTICAL
XF3
S3
F3
1/2 AMP
R2
75
DS3
B SCT AZ & EL
XF4
S4
F4
2 AMP
R3
50
DS4
C SXT VERTICAL
XF5
S5
F5
2 AMP
R4
50
DS5
D SXT HORIZONTAL
XF6
S6
F6
2 AMP
R5
50
DS6
E REF
XF7
S7
F7
8 AMP
R6
2
DS7
F RESOLUTION
J
K
G
H
J1
H B D E F C G A
115 V, 60 CPS, HI
115 V, 60 CPS, LO
CHASSIS GRD
S1
2 3
5 6
XF1
F1
2 AMP
XDS1
DS1
C1
3
T1
1 2 3 4 5 6

REFERENCE DRAWING
1. WIRING DIAGRAM 1019757

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT W

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019717	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 020040010
DRAWN MARGIOTTA DATE 12-9-63
CHECKED J [illegible] 1-15-64
APPROVAL
APPROVAL
NASA APPROVAL 1-31-64
MIT APPROVAL 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019754
SCALE ~
WEIGHT ~ CALC ACTUAL
SHEET 1 OF 1

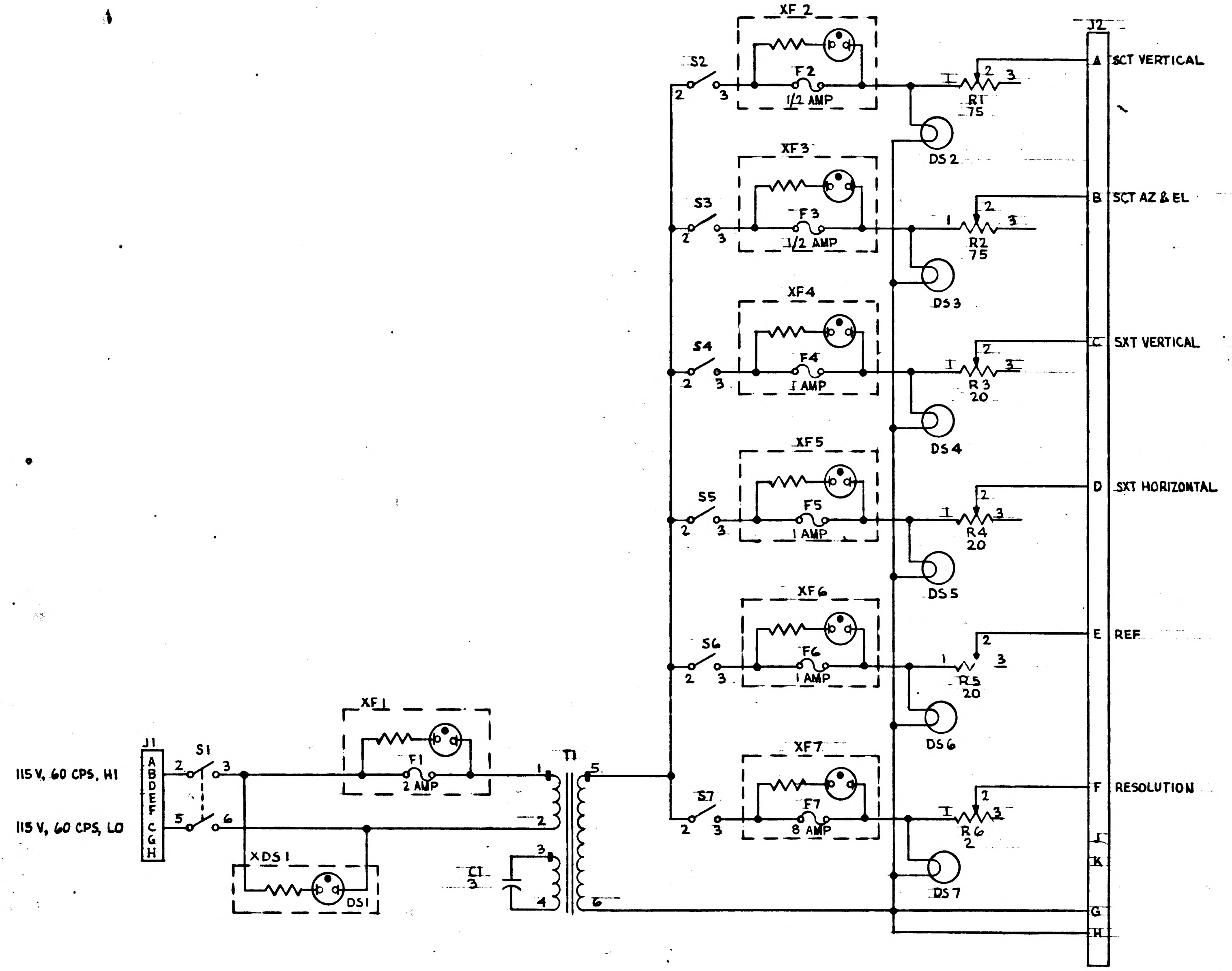
1019754 B

1019754

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. PARTS LIST TO BE FOR REFERENCE ONLY

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1017477	03386900626	CAPACITOR	3 UF	±20%	600V
DS1			1017463	6825700190	LAMP GLOW (NEON)			
DS2			1017511-1	6825700070	↑ INCANDESCENT			
DS3			↕	↕	↕ ↕			
DS4								
DS5								
DS6								
DS7			1017511-1	6825700070	LAMP INCANDESCENT			
F1			PENDING		FUSE, CARTRIDGE, 3AG-2A			2 AMP
F2			MS90079-18	68151000917	↕			1/2 AMP
F3			MS90079-18	68151000917				1/2 AMP
F4			MS90079-20	68151000921				1 AMP
F5			MS90079-20	68151000921				1 AMP
F6			MS90079-20	68151000921				1 AMP
F7			MS90079-23	68151000933	FUSE, CARTRIDGE			8 AMP
J1			MS3122E-16-8P		CONNECTOR			
J2			MS3122E-12-10S		CONNECTOR			
R1			1017498	03386900668	RESISTOR, WW	75	±10%	2 W
R2			1017498	03386900668	↕	75	±10%	2 W
R3			1017499	03386900669		20	±10%	4 W
R4			1017499	03386900669		20	±10%	4 W
R5			1017499	03386900669		20	±10%	4 W
R6			1017500	03386900670	RESISTOR, WW	2	±10%	50W
S1			MS25307-22		SWITCH TOGGLE, DPST			
S2			MS25306-22		↑ SPST			
S3			↕		↕ ↕			
S4								
S5								
S6								
S7			MS25306-22		SWITCH TOGGLE SPST			
T1			1017475	03386900625	TRANSFORMER			
XDS1			1017465	68251002105	LAMP HOLDER			
XF1			PENDING	68152001406	FUSE HOLDER			
XF2			↕	↕	↕			
XF3								
XF4								
XF5								
XF6								
XF7			PENDING	68152001406	FUSE HOLDER			



115 V, 60 CPS, HI
115 V, 60 CPS, LO
J1
A B D E F C G H
S1
2 3 5 6
XF1
F1
2 AMP
XDS1
DS1
T1
1 2 3 4 5 6
C1
3
S2
XF2
F2
1/2 AMP
S3
XF3
F3
1/2 AMP
S4
XF4
F4
1 AMP
S5
XF5
F5
1 AMP
S6
XF6
F6
1 AMP
S7
XF7
F7
8 AMP
R1
75
R2
75
R3
20
R4
20
R5
20
R6
2
DS2
DS3
DS4
DS5
DS6
DS7
J2
A SCT VERTICAL
B SCT AZ & EL
C SXT VERTICAL
D SXT HORIZONTAL
E REF
F RESOLUTION
J
K
G
H

REFERENCE DRAWING
1. WIRING DIAGRAM 1019757

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 **DATE** 2-4-

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019717	1016910
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± ~ ; ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17 02004 0010
DRAWN J MARGIOTTA DATE 12-9-63
CHECKED J [illegible] 1-15-64
APPROVAL
APPROVAL
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL [illegible] 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019754
SCALE ~
WEIGHT ~ CALC ACTUAL
SHEET 1 OF 1

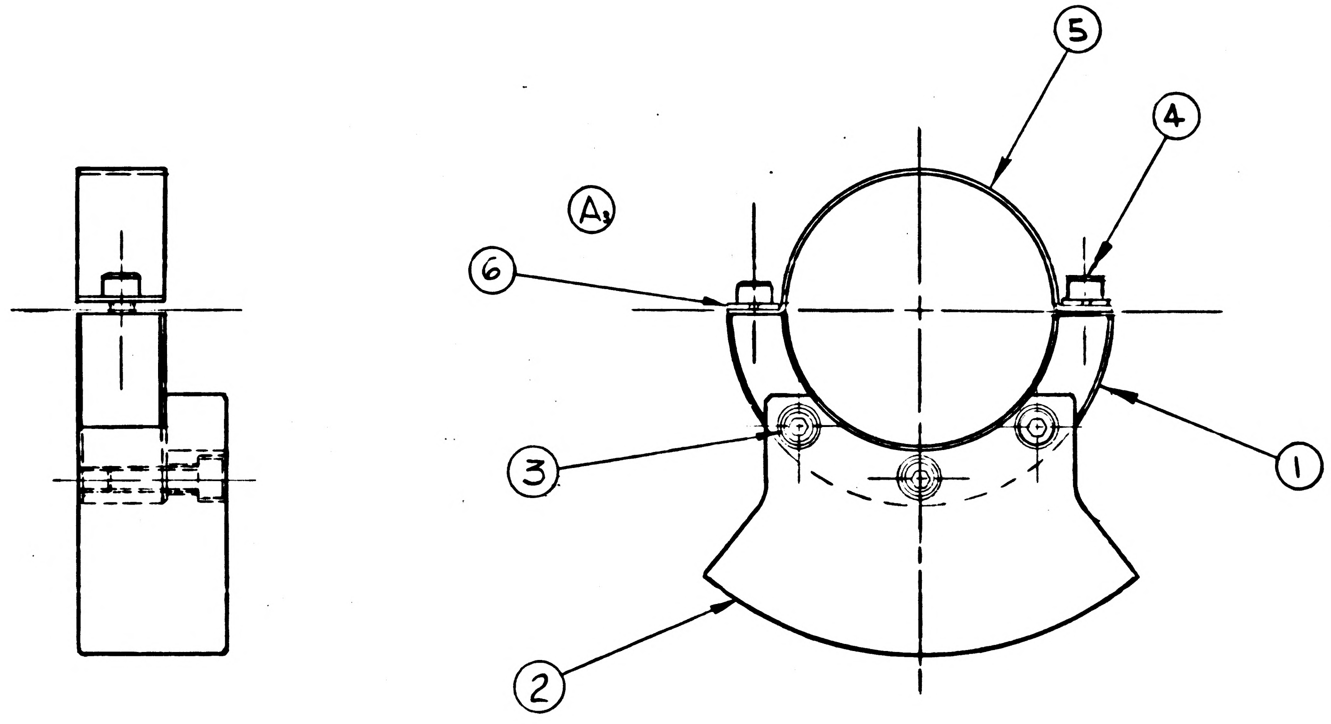
1019755 A

M

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A_3	B3	REVISED PER ECP 104788 TDRR 13712 DATE 10/20/64	2-16-64 C.R	B.W. 9-10-64

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- IDENTIFY IN ACCORDANCE WITH ND 1002019.

A_1



A_2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	2		MS35337-81	74439050005		WASHER, LOCK			
5	1		1019224	03386900789		CLAMP			
4	2		1017418-23	74455058023		SCREW, CAP, HEX, SOC HD			
3	3		1017418-26	74455058026		SCREW, CAP, HEX, SOC HD			
2	1		1019162	03386900720		COUNTERWEIGHT, AUTOCOLLIMATOR			
1	1		1019161	03386900719		CLAMP, COUNTERWEIGHT, AUTOCOLLIMATOR			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05605 **DATE** 1/7/64

NEXT ASSY	USED ON
1016952	1016952
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900146

DRAWN B. Kozlowski DATE 12-11-63
CHECKED 12-11-63
APPROVAL
APPROVAL 12-18-63
NASA APPROVAL 1-7-64
MIT APPROVAL Jan 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT, ASSEMBLY
AUTOCOLLIMATOR.

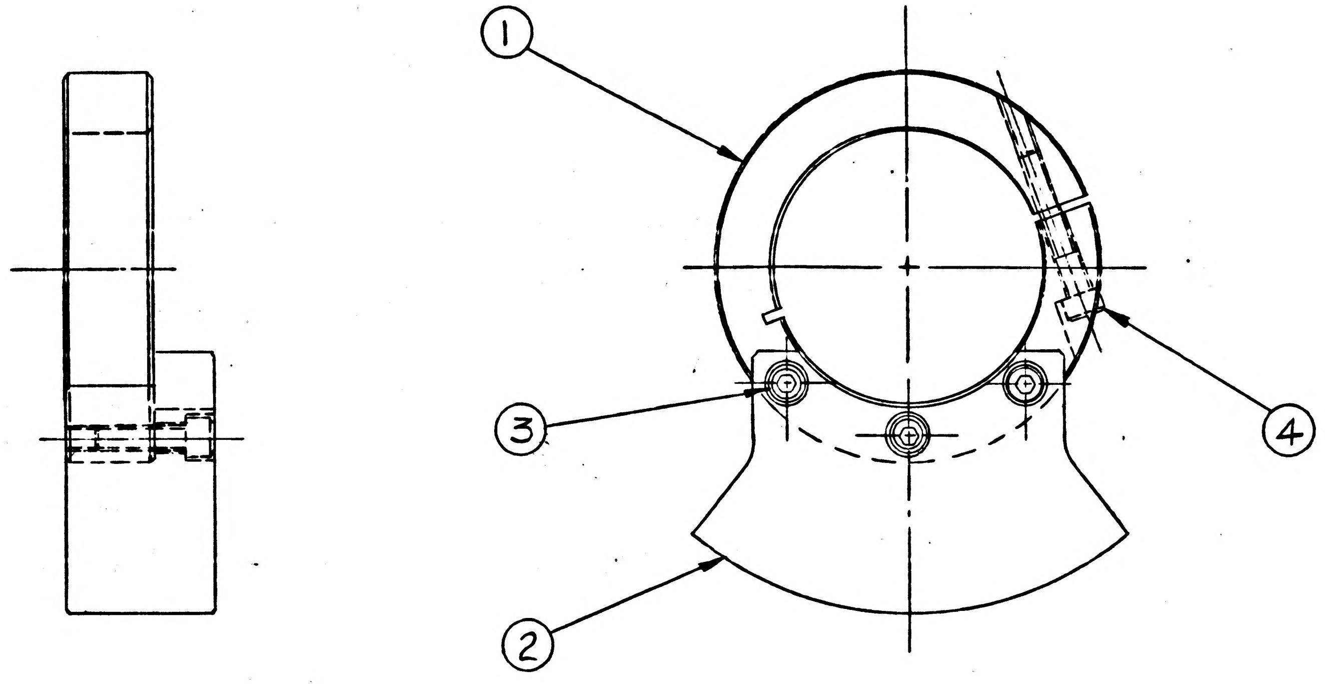
CODE IDENT NO.
SIZE C
NASA NUMBER 1019755
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019755 A

E-154

1019755

NOTE
INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 05605 **DATE** 1/7/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		1017418-29	74455058029		SCREW, CAP, HEX, SOC HD #10-24 x 1.250 LG			
3	3		1017418-26	74455058026		SCREW, CAP, HEX, SOC HD #10-24 x .750 LG			
2	1		1019162	03386900720		COUNTERWEIGHT, AUTOCOLLIMATOR			
1	1		1019161	03386900719		CLAMP, COUNTERWEIGHT, AUTOCOLLIMATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1016952	1016952
1016910	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900146

DRAWN B. Kozlowski DATE 12-11-63
CHECKED B. Kozlowski 12-11-63
APPROVAL
APPROVAL 12-18-63
NASA APPROVAL Barnard 1-7-64
MIT APPROVAL 7 Jan 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT, ASSEMBLY
AUTOCOLLIMATOR

CODE IDENT NO. SIZE C NASA NUMBER 1019755
SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

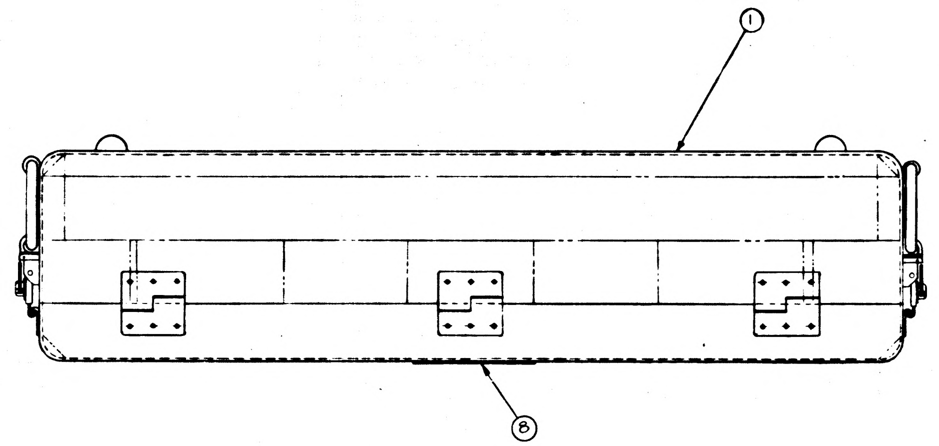
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

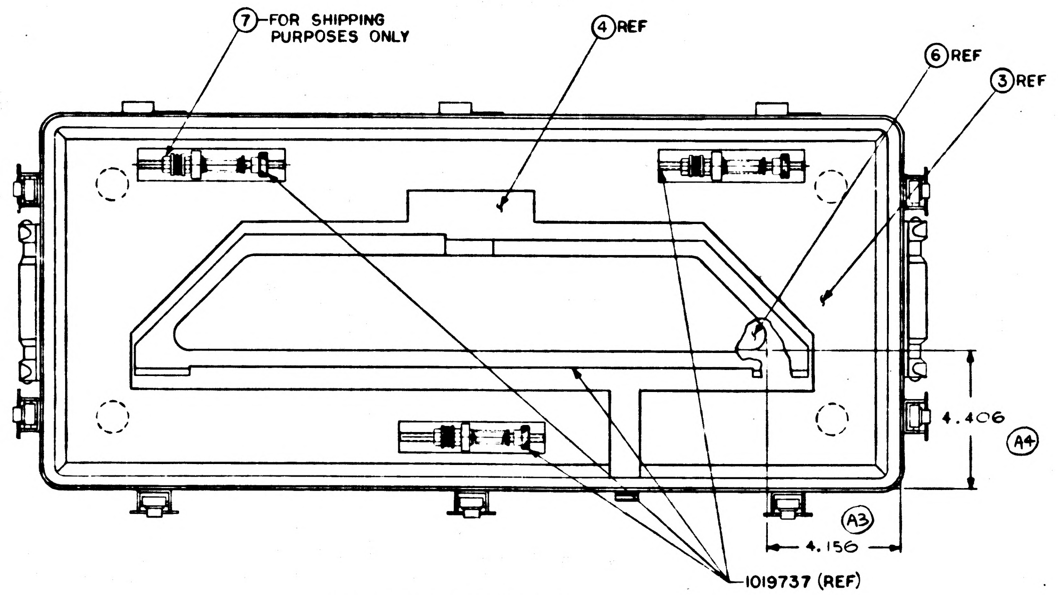
A 1019756

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A5		REVISED PER ECP 103481 TORR ~~~ DATE 11/12/64	3-6-64 C.B.	[illegible]

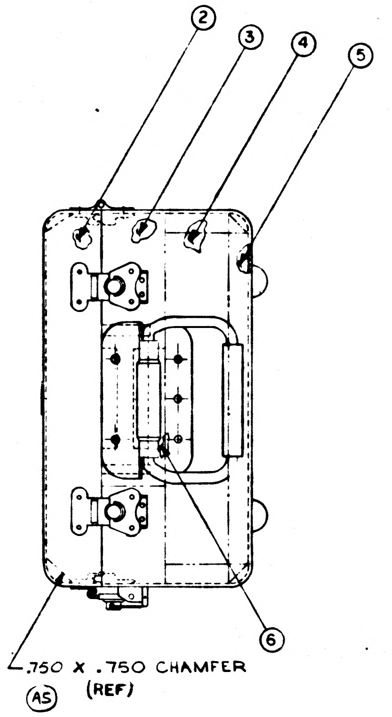
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT ITEM 2 TO TOP OF CASE.
   CEMENT ITEMS 3,4,5 TOGETHER AND ITEM 6 TO ITEM 4 AS DIMENSIONED, AND THEN CEMENT INTO BOTTOM OF CASE. WITH EC-1357 PER MIL-A-1154.
3. IDENTIFY USING NASA DRAWING NO. REVISION LETTER & MANUFACTURER'S SYM PER ND 1002019.
4. APPLY IDENTIFICATION PLATE NO. 1019253 USING EC 826 PER MIL-A-5092, CENTRALLY LOCATED TO TOP OF UNIT AS SHOWN. (A4)





VIEW WITH COVER REMOVED



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1		1019253	03386900816		PLATE, IDENTIFICATION			
7	3		MS35690-410			NUT, HEX (1/4 20 NC 2B)			
6	1		1019182	03386900735		CUSHION-SUPPORT			
5	1		1019184	03386900737		CUSHION-BOTTOM			
4	1		1019183	03386900736		CUSHION-CENTER			
3	1		1019186	03386900739		CUSHION-CENTER			
2	1		1019185	03386900738		CUSHION-TOP			
1	1		1001652	03386900740		CASE-STORAGE			

(A2)

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. D6140 DATE 2-4-64

NEXT ASSY	USED ON
1019737	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900148
DRAWN G. L. Rhodes DATE 1-6-64
CHECKED J Anderson 1-21-64
APPROVAL
APPROVAL [illegible] 1-23-64
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE STORAGE ASSY,
AZIMUTH CHECK BAR

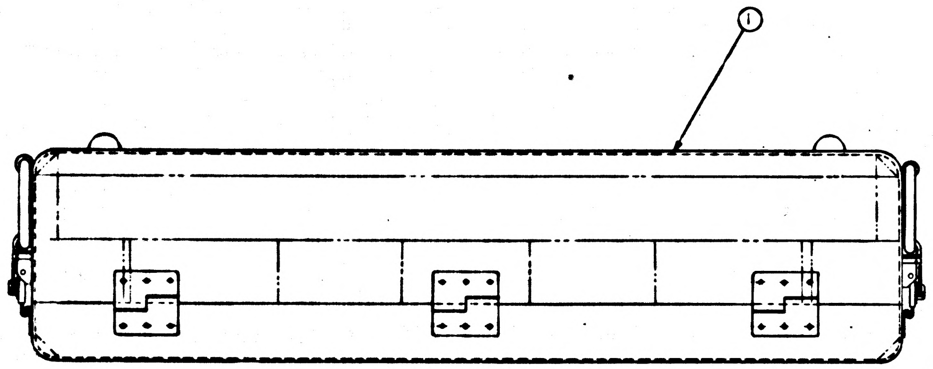
CODE IDENT NO.
SIZE E
NASA NUMBER 1019756
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

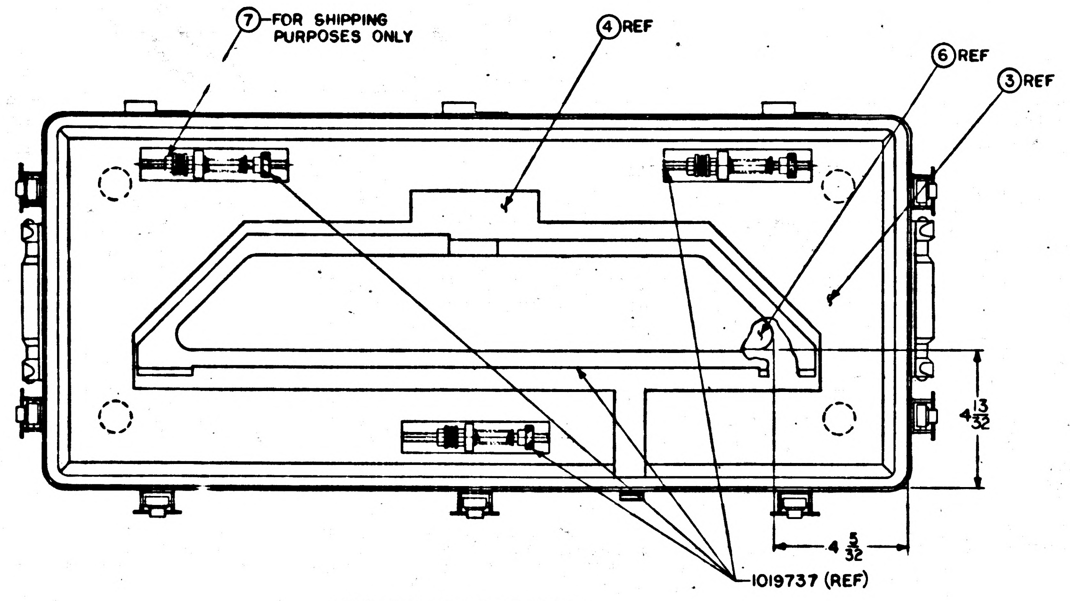
1019756

1019756

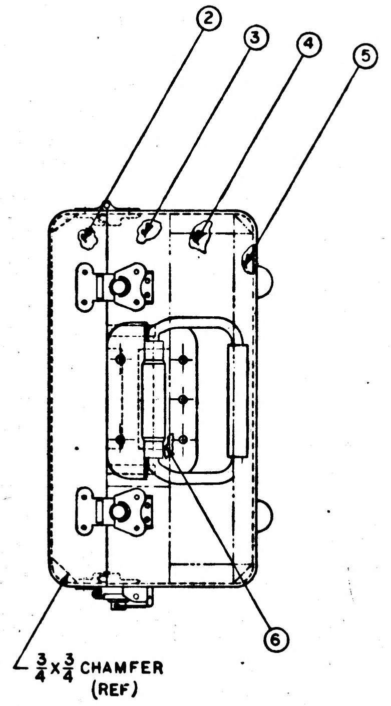
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT ITEM 2 TO TOP OF CASE.
CEMENT ITEMS 3,4,5 TOGETHER AND ITEM 6 TO ITEM 4 AS DIMENSIONED, AND THEN CEMENT INTO BOTTOM OF CASE. WITH EC-1357 PER MIL-A-1154.
3. IDENTIFY USING NASA DRAWING NO. REVISION LETTER & MANUFACTURER'S SYM PER ND 1002019.





VIEW WITH COVER REMOVED



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	3		MS35690-410			NUT, HEX (1/4-20 NC-2B)			
6	1		1019182	03386900735		CUSHION-SUPPORT			
5	1		1019184	03386900737		CUSHION-BOTTOM			
4	1		1019183	03386900736		CUSHION-CENTER			
3	1		1019186	03386900739		CUSHION-CENTER			
2	1		1019185	03386900738		CUSHION-TOP			
1	1		1001652	03386900740		CASE-STORAGE			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 06140 DATE 2-4-64

NEXT ASSY	USED ON
1019737	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900148
DRAWN R.L. Rhodes DATE 1-6-64
CHECKED J. Morton 1-21-64
APPROVAL
APPROVAL 1-23-64
NASA APPROVAL
1-31-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CASE STORAGE ASSY,
AZIMUTH CHECK BAR

CODE IDENT NO.
SIZE E
NASA NUMBER 1019756
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019756

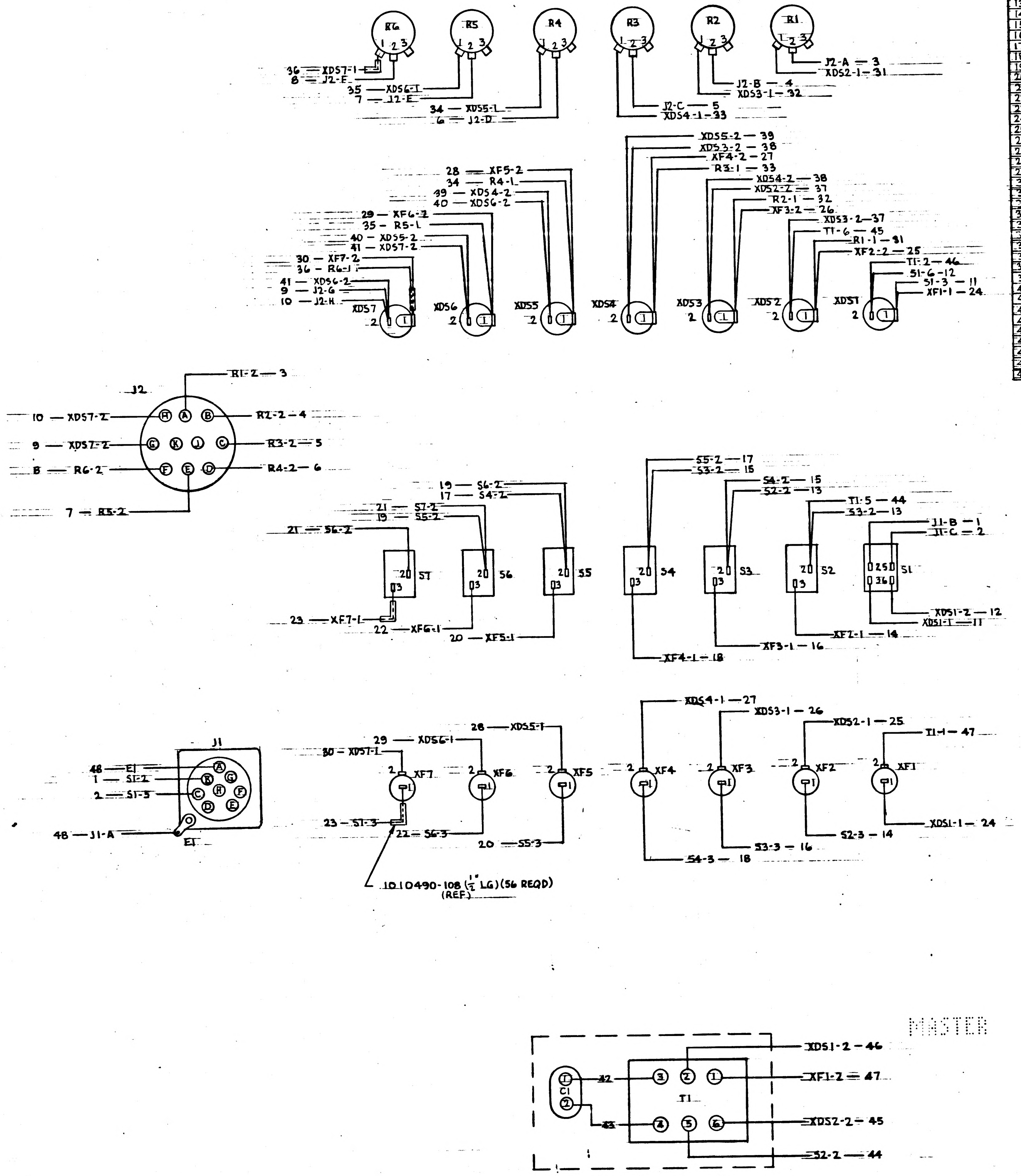
1019757 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E-4	ADDED COND NO. 48	2-25-64	
		TDRC 07175	3/24/67	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. BIND WIRES TOGETHER USING PT NO. 1011753. AS REQD.
4. WIRE TO CONFORM WITH ND 1002181 TYPE I, CLASS I EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).

COND NO.	PART NO. REF	AWG NO.	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	REFER TO NOTE 4	16	GY		J1-B	S1-2	
2		16	BLK		J1-C	S1-5	
3		20	BLK		J2-A	R1-2	
4			GY		J2-B	R2-2	
5			YEL		J2-C	R3-2	
6			GRN		J2-D	R4-2	
7			ORN		J2-E	R5-2	
8			BRN		J2-F	R6-2	
9			BLU		J2-G	XDS7-2	
10			VIO		J2-H	XDS7-2	
11			RED		S1-3	XDS1-1	
12			GRN		S1-6	XDS1-2	
13			YEL		S2-2	S3-2	
14			BLK		S2-3	XF2-1	
15			RED		S3-2	S4-2	
16			GY		S3-3	XF3-1	
17			BRN		S4-2	S5-2	
18			BLK		S4-3	XF4-1	
19			YEL		S5-2	S6-2	
20			GRN		S5-3	XF5-1	
21			BLU		S6-2	S7-2	
22			GRN		S6-3	XF6-1	
23			YEL		S7-3	XF7-1	
24			BLU		XF1-1	XDS1-1	
25			YEL		XF2-2	XDS2-1	
26			BLK		XF3-2	XDS3-1	
27			RED		XF4-2	XDS4-1	
28			BLU		XF5-2	XDS5-1	
29			YEL		XF6-2	XDS6-1	
30			GY		XF7-2	XDS7-1	
31			RED		XDS2-1	R1-1	
32			YEL		XDS3-1	R2-1	
33			GRN		XDS4-1	R3-1	
34			BRN		XDS5-1	R4-1	
35			GY		XDS6-1	R5-1	
36			BLK		XDS7-1	R6-1	
37			BRN		XDS2-2	XDS3-2	
38			BLU		XDS3-2	XDS4-2	
39			YEL		XDS4-2	XDS5-2	
40			RED		XDS5-2	XDS6-2	
41			BRN		XDS6-2	XDS7-2	
42			BLK		T1-3	C1-1	
43		20	BRN		T1-4	C1-2	
44		14	ORN		T1-5	S2-2	
45		14	GRN		T1-6	XDS2-2	
46		20	YEL		T1-2	XDS1-2	
47	REFER TO NOTE 4	20	VIO		T1-1	XF1-2	
48	REFER TO NOTE 4	20	YEL		J1-A	E1	



REFERENCE DRAWING
1. SCHEMATIC DIAGRAM 1019754

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019717	1016510

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020040030
DRAWN J MARGIOTTA DATE 12-23-63
CHECKED J. ADLESTEIN 1-15-64
APPROVAL 2-27-64
APPROVAL 1-23-64
NASA APPROVAL 1-27-64
MIT APPROVAL 2/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX WIRING DIAGRAM

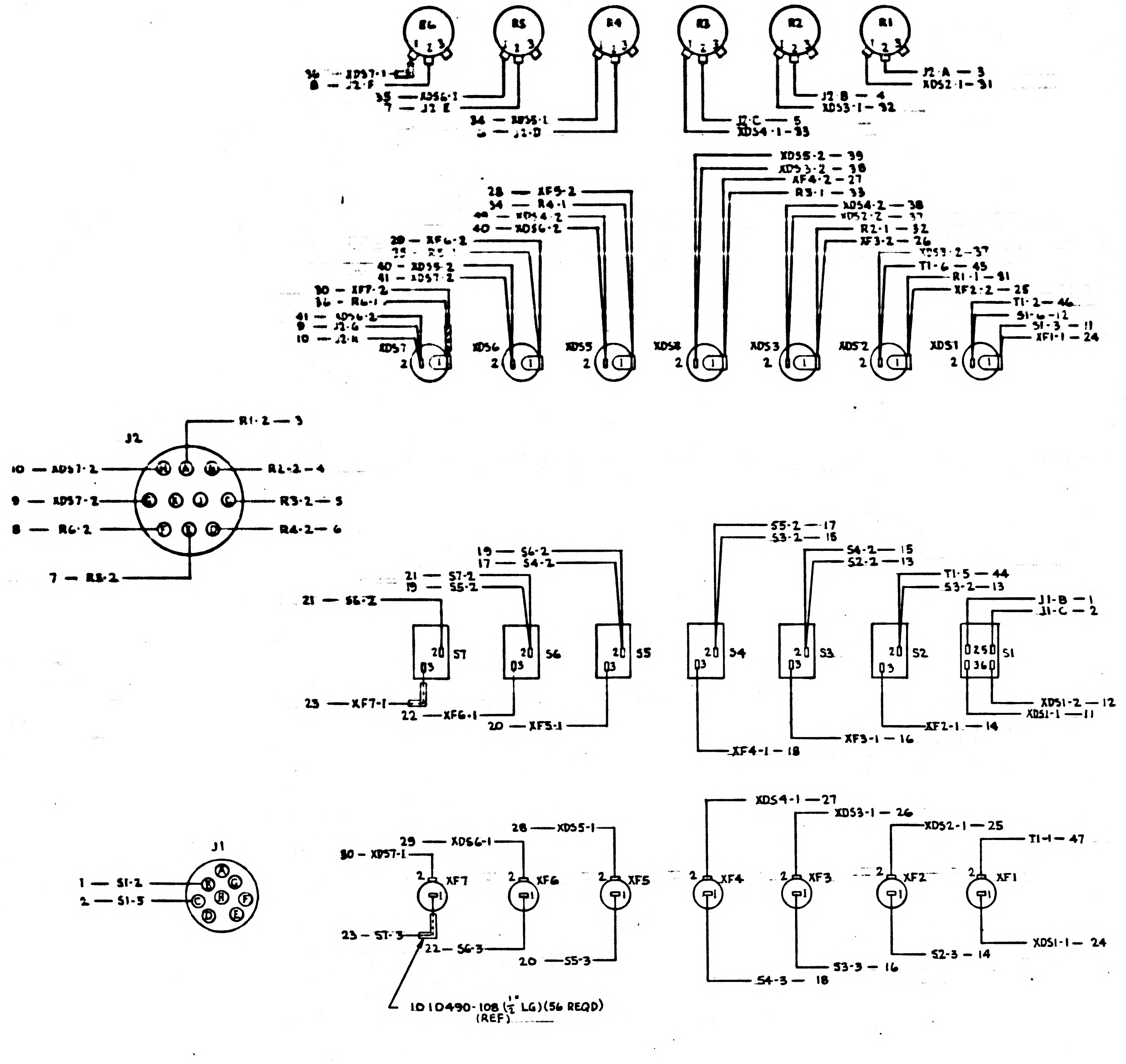
CODE IDENT NO.
SIZE E
NASA NUMBER 1019757
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019757

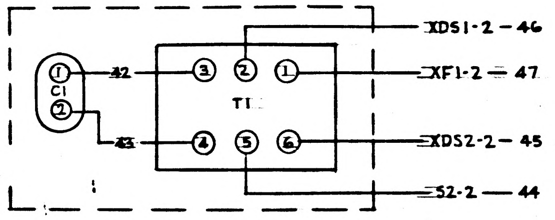
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVED

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. [illegible] NO 1007014.
3. TIE WIRES TOGETHER USING PT NO [illegible] AS REQD
4. WIRE TO CONFORM WITH NO 1003101 TYPE [illegible] CLASS [illegible] EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).

COND NO	PART NO REF	AWG	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	[illegible] 4	[illegible]	GY		J1-B	S1-2	
2			BLK		J1-C	S1-5	
3			BLK		J2-A	R1-2	
4			GY		J2-B	R2-2	
5			YEL		J2-C	R3-2	
6			GRN		J2-D	R4-2	
7			GRN		J2-E	R5-2	
8			BRN		J2-F	R6-2	
9			BLU		J2-G	XDS7-2	
10			RED		J2-H	XDS7-2	
11			RED		S1-3	XDS1-1	
12			GRN		S1-6	XDS1-2	
13			YEL		S2-2	S3-2	
14			BLK		S2-3	XF2-1	
15			RED		S3-2	S4-2	
16			GY		S3-3	XF3-1	
17			BRN		S4-2	S5-2	
18			BLK		S4-3	XF4-1	
19			GY		S5-2	S6-2	
20			ORN		S5-3	XF5-1	
21			BLU		S6-2	S7-2	
22			GRN		S6-3	XF6-1	
23			YEL		S7-3	XF7-1	
24			BLU		XF1-1	XDS1-1	
25			YEL		XF2-2	XDS2-1	
26			BLK		XF3-2	XDS3-1	
27			RED		XF4-2	XDS4-1	
28			BLU		XF5-2	XDS5-1	
29			YEL		XF6-2	XDS6-1	
30			GY		XF7-2	XDS7-1	
31			RED		XDS2-1	R1-1	
32			YEL		XDS3-1	R2-1	
33			GRN		XDS4-1	R3-1	
34			BRN		XDS5-1	R4-1	
35			GY		XDS6-1	R5-1	
36			BLK		XDS7-1	R6-1	
37			BRN		XDS2-2	XDS3-2	
38			BLU		XDS3-2	XDS4-2	
39			YEL		XDS4-2	XDS5-2	
40			RED		XDS5-2	XDS6-2	
41			BRN		XDS6-2	XDS7-2	
42			BLK		T1-3	C1-1	
43		20	BRN		T1-4	C1-2	
44		14	ORN		T1-5	S2-2	
45		14	GRN		T1-6	XDS2-2	
46		20	YEL		T1-2	XDS1-2	
47	REFER TC NOTE 4	20	VIO		T1-1	XF1-2	


R6
R5
R4
R3
R2
R1
36 — XDS7-1
8 — J2-F
35 — XDS6-1
7 — J2-E
34 — XDS5-1
6 — J2-D
J2-C — 5
XDS4-1 — 33
J2-B — 4
XDS3-1 — 32
J2-A — 3
XDS2-1 — 31
XDS5-2 — 39
XDS3-2 — 38
XF4-2 — 27
R3-1 — 33
XDS4-2 — 38
XDS2-2 — 37
R2-1 — 32
XF3-2 — 26
XDS3-2 — 37
T1-6 — 45
R1-1 — 31
XF2-2 — 25
T1-2 — 46
S1-6 — 12
S1-3 — 11
XF1-1 — 24
28 — XF5-2
34 — R4-1
40 — XDS4-2
40 — XDS6-2
29 — XF6-2
35 — R5-1
40 — XDS5-2
41 — XDS7-2
30 — XF7-2
36 — R6-1
41 — XDS6-2
9 — J2-G
10 — J2-H
XDS7
XDS6
XDS5
XDS4
XDS3
XDS2
XDS1
J2
R1-2 — 3
10 — XDS7-2
R2-2 — 4
9 — XDS7-2
R3-2 — 5
8 — R6-2
R4-2 — 6
7 — R5-2
19 — S6-2
17 — S4-2
21 — S7-2
19 — S5-2
21 — S6-2
S5-2 — 17
S3-2 — 15
S4-2 — 15
S2-2 — 13
T1-5 — 44
S3-2 — 13
J1-B — 1
J1-C — 2
S7
S6
S5
S4
S3
S2
S1
XDS1-2 — 12
XDS1-1 — 11
23 — XF7-1
22 — XF6-1
20 — XF5-1
XF4-1 — 18
XF3-1 — 16
XF2-1 — 14
J1
1 — S1-2
2 — S1-5
XDS4-1 — 27
XDS3-1 — 26
XDS2-1 — 25
T1-1 — 47
29 — XDS6-1
28 — XDS5-1
30 — XDS7-1
XF7
XF6
XF5
XF4
XF3
XF2
XF1
XDS1-1 — 24
23 — S7-3
22 — S6-3
20 — S5-3
S4-3 — 18
S3-3 — 16
S2-3 — 14
1010490-108 (1/2" LG)(56 REQD) (REF)

REFERENCE DRAWING
1. SCHEMATIC DIAGRAM 1019754


C1
T1
42
43
XDS1-2 — 46
XF1-2 — 47
XDS2-2 — 45
S2-2 — 44

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06140 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019717	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020040030
DRAWN J. MARGIOTTA DATE 12-23-63
CHECKED J. ADLERSTEIN 1-15-64
APPROVAL
APPROVAL [illegible] 1-22-64
NASA APPROVAL [illegible] 1-31-64
MIT APPROVAL [illegible] 2/4/64

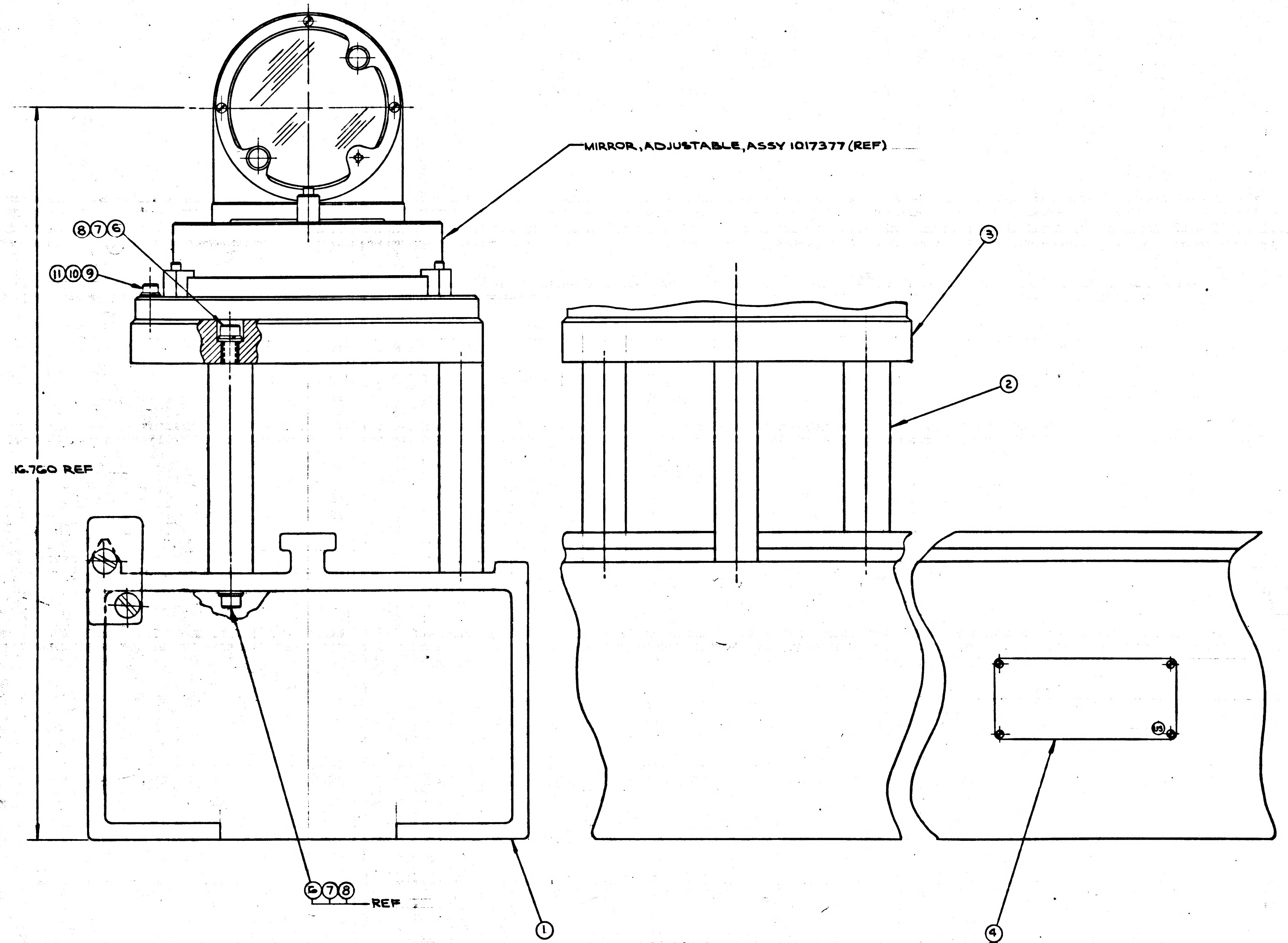
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL BOX
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019757
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019758	A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		ADDED SHEET 2 & ITEMS 12 & 13 TDR 02661	3-[illegible] CS [illegible]	ECN 10346[illegible]



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06347 DATE 2-11-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1		1001654	16020150010		ADAPTER, TRIPOD			
12	1		1001663	03386900824		CARRIAGE, THEODOLITE			
11	3		AN960C416L	74468050006		WASHER, FLAT (1/4)			
10	3		MS35337-82	74439050006		WASHER, LOCK, SPLIT (1/4)			
9	3		1017418-36	74455058036		SCREW, CAP SOC. HD. (1/4-20NC-3A X 1" LG)			
8	6		MS35337-83	74439050007		WASHER, LOCK, SPLIT (5/16)			
7	6		AN960-C516	74468051007		WASHER, FLAT (5/16)			
6	6		1017418-46	74455058046		SCREW, CAP SOC. HD. (5/16-18 NC-3A x 1" LG)			
5	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING (#2-32 x 3/16 LG)			
4	1		1019200	03386900764		PLATE, IDENTIFICATION			
3	1		1019198	03386900762		BASE			
2	3		1019199	03386900763		POST			
1	1		1019197	03386900761		TOOLING BAR (MACHINING)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386900026

DRAWN R. Brauner DATE 1-23-64
CHECKED J. Anderson 1-29-64
APPROVAL
APPROVAL [illegible] 1-31-64
NASA APPROVAL W. J. [illegible] 2-11-64
MIT APPROVAL [illegible] 2-11-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TOOLING BAR
ASSEMBLY

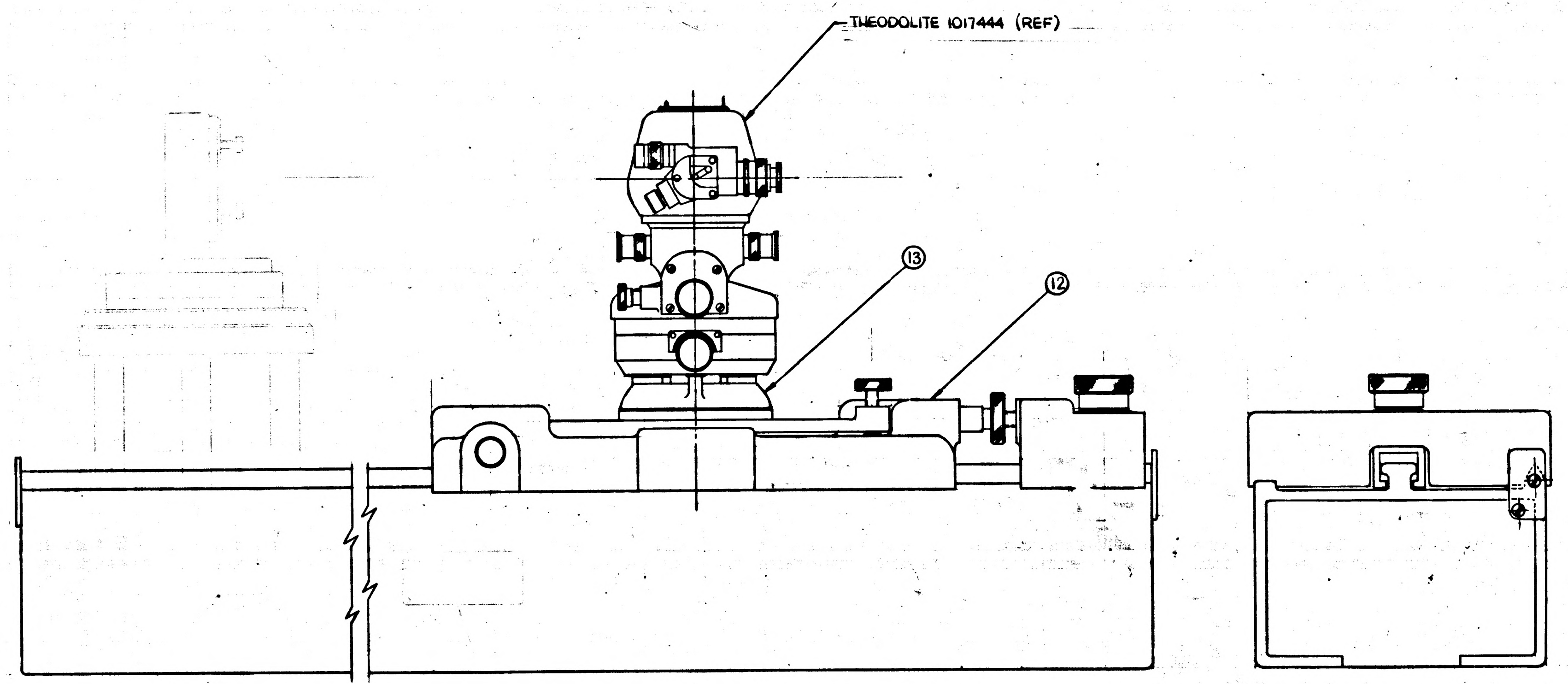
CODE IDENT NO.
SIZE E
NASA NUMBER 1019758
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

MASTER

INCHES
0 1
PHOTOGRAPHIC SCALE ONLY

1019758 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	–	SEE SHEET 1 TDR 076-1		



FOR INFORMATION ONLY

CLASS B RELEASE TDR No.__________ DATE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386900026
DRAWN C. Baranky DATE 3-12-64
CHECKED 3-19-64
APPROVAL
APPROVAL 3-19-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TOOLING BAR
ASSEMBLY

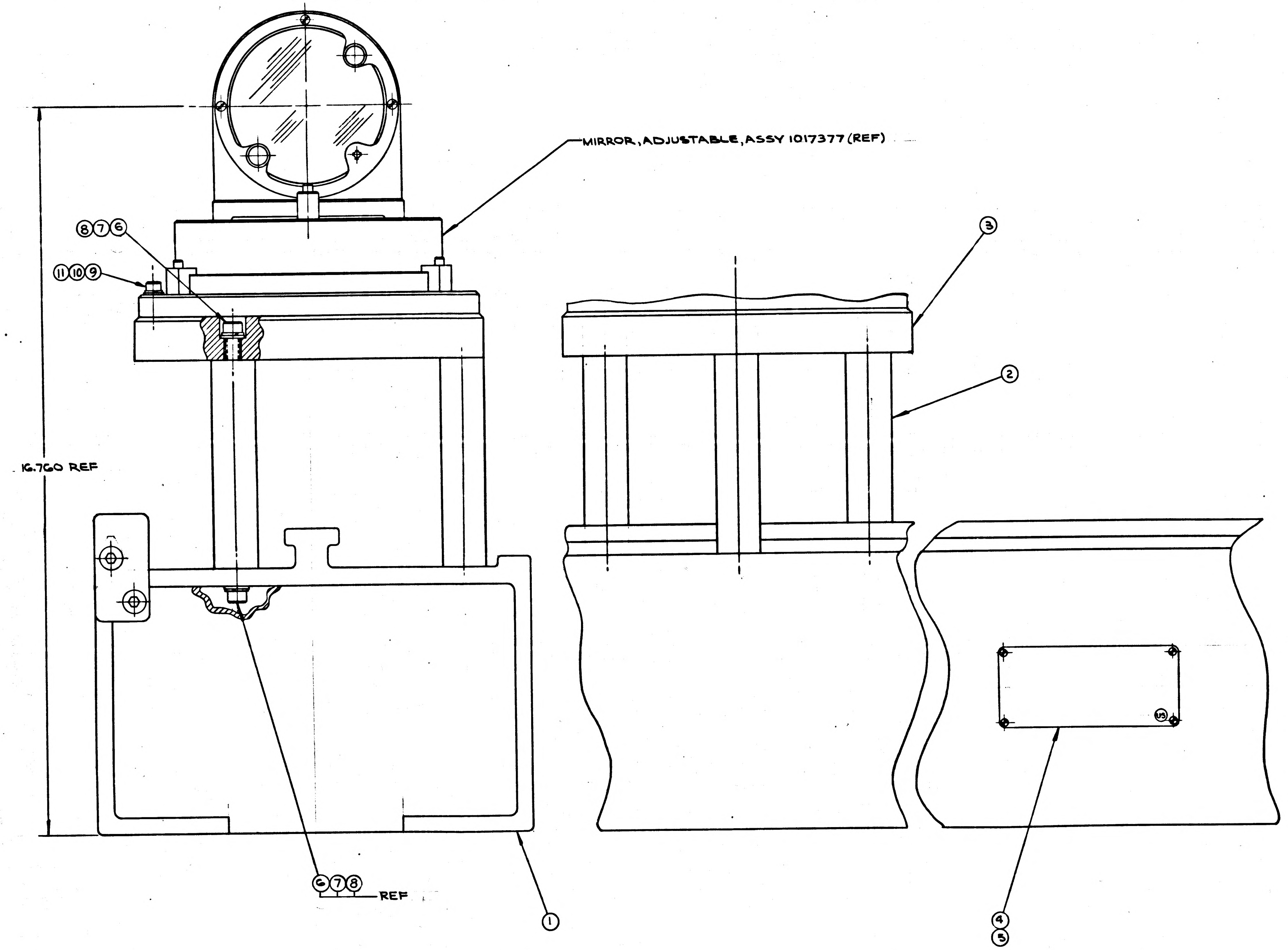
CODE IDENT NO.
SIZE E
NASA NUMBER 1019758
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 2 OF 2

INCHES
PHOTOGRAPHIC SCALE ONLY

1019758

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06347 **DATE** 2-11-64

IT. M NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	3		AN960C416L	74468050006		WASHER, FLAT (1/4)			
10	3		MS35337-82	74439050006		WASHER, LOCK, SPLIT (1/4)			
9	3		1017418-36	74455058036		SCREW, CAP SOC. HD. (1/4-20 NC-3A X 1" LG)			
8	6		MS35337-83	74439050007		WASHER, LOCK, SPLIT (5/16)			
7	6		AN960-C516	74468051007		WASHER, FLAT (5/16)			
6	6		1017418-46	74455058046		SCREW, CAP, SOC. HD. (5/16-18 NC-3A x 1" LG)			
5	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING (#2-32 x 3/16 LG)			
4	1		1019200	03386900764		PLATE, IDENTIFICATION			
3	1		1019198	03386900762		BASE			
2	3		1019199	03386900763		POST			
1	1		1019197	03386900761		TOOLING BAR (MACHINING)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386900026
DRAWN Rindluner DATE 1-23-64
CHECKED J. Adlerstein 1-29-64
APPROVAL
APPROVAL 1-31-64
NASA APPROVAL W. J. 2-11-64
MIT APPROVAL 2-11-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

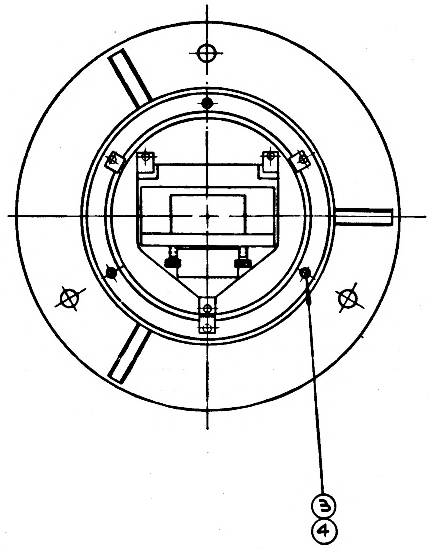
TITLE
TOOLING BAR
ASSEMBLY

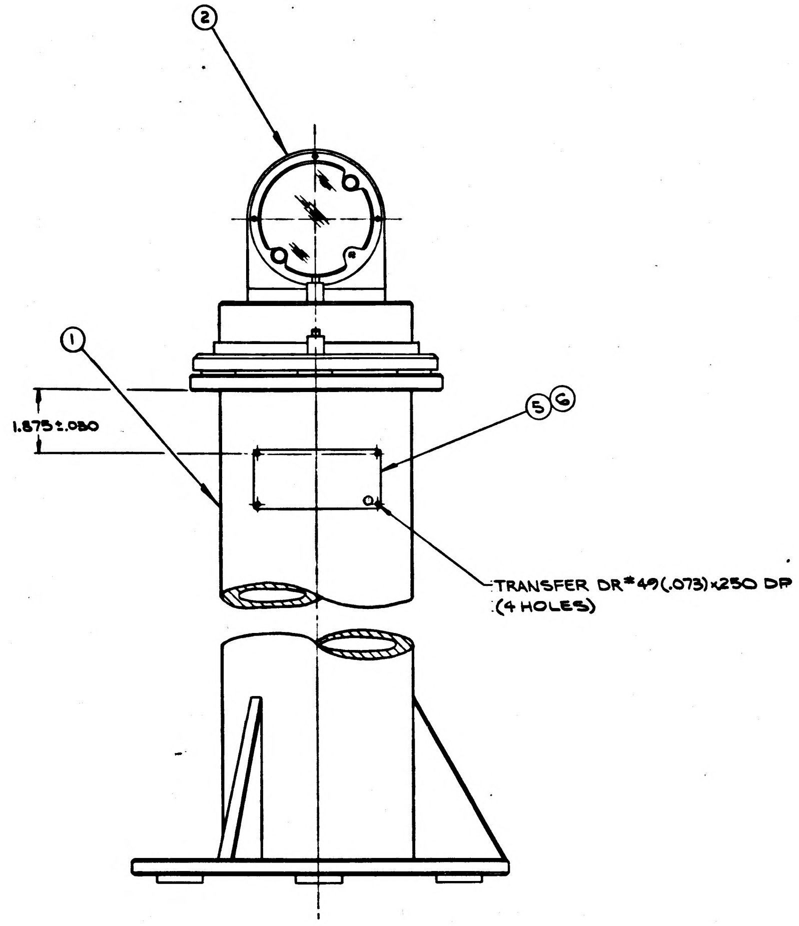
CODE IDENT NO.
SIZE E
NASA NUMBER 1019758
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL





FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 06139 DATE 2-4-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	4		MS24646-1	74455015001		SCREW, TAPPING THREAD CUTTING (#2-32 x 3/16 LG)			
5	1		1019205	03386900769		PLATE, IDENTIFICATION			
4	3		MS35338-82	74439003006		WASHER, LOCK SPLIT			
3	3		1017418-36	74455058036		SCREW, CAP. SOC. HD (1/4-20 NC-3A x 1")			
2	1		1017377	02386900145		MIRROR, ADJUSTABLE			
1	1		1019174	03386900730		PEDESTAL, ADJUSTABLE MIRROR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017377

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900152

DRAWN Rhodewalt DATE 1-28-64
CHECKED N. Gadwell 1-29-64
APPROVAL
APPROVAL 1-29-64
NASA APPROVAL 1-31-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
ADJUSTABLE MIRROR PEDESTAL ASSEMBLY

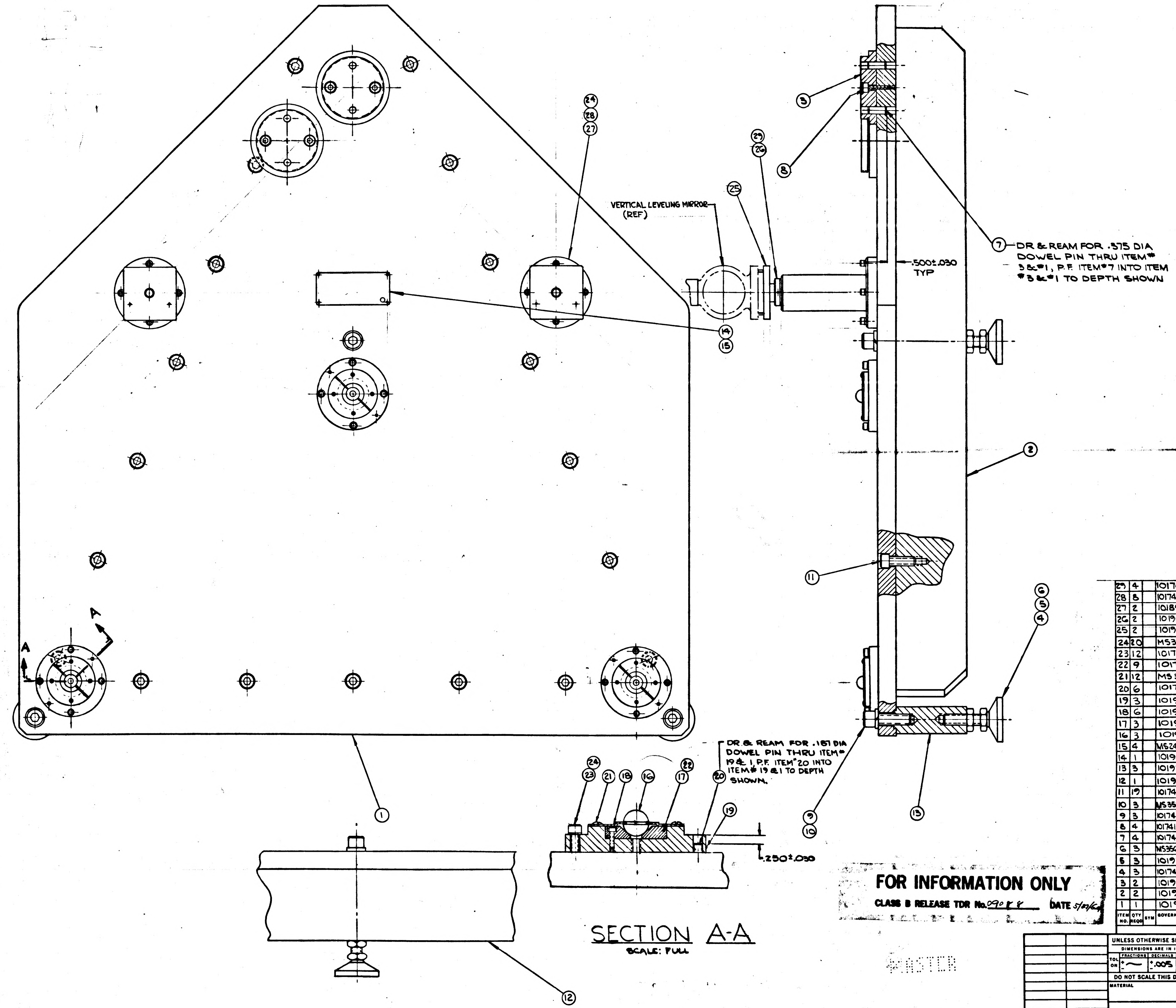
CODE IDENT NO.
SIZE E
NASA NUMBER 1019759
SCALE 1:8
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

1019760

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- IDENTIFY USING NASA PART NO., REV LETTER & MFRS SYM PER ND 1002019



VERTICAL LEVELING MIRROR (REF)
.500±.030 TYP
DR & REAM FOR .375 DIA DOWEL PIN THRU ITEM# 3 & #1, P.F. ITEM#7 INTO ITEM #3 & #1 TO DEPTH SHOWN
DR & REAM FOR .151 DIA DOWEL PIN THRU ITEM# 19 & 1, P.F. ITEM#20 INTO ITEM# 19 & 1 TO DEPTH SHOWN.
.250±.030
A
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29

SECTION A-A
SCALE: FULL

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 090 E 8 DATE 5/27/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	4		1017414-9	74455130009		SETSCREW, NYLON TIP			
28	8		1017418-37	74455058037		SCREW, CAP, SOC HD (1/4-20NC-2A x 1 1/4 LG)			
27	2		1018998	16020100020		PLATE			
26	2		1019002	16020100060		COLLAR			
25	2		1019833	02386900175		SHAFT ASSEMBLY			
24	20		MS35338-82	74439003006		WASHER, LOCK, SPLIT (1/4)			
23	12		1017418-34	74455058034		SCREW, CAP, SOC, HD			
22	9		1017418-11	74455058011		SCREW, CAP, SOC HD.			
21	12		MS 35233-13	74455069013		SCREW, PAN HD			
20	6		1017424-75	73002505113		PIN, DOWEL			
19	3		1019176	03386900746		FOOT, INSERT BALL			
18	6		1019195	03386900758		RETAINER, BALL			
17	3		1019270	03386900874		INSERT, BALL			
16	3		1019190	03386900748		BALL, MOUNTING			
15	4		MS24646-1	74455075001		SCREW, TAPPING, TH'D CUTTING			
14	1		1019250	03386900812		PLATE, IDENTIFICATION			
13	3		1019219	03386900784		POST			
12	1		1019222	03386900787		RIB			
11	19		1017418-68	74455058068		SCREW, CAP, SOC. HD 1/2-13NC-3A x 1 1/2 LG			
10	3		MS35338-88	74439003012		WASHER, LOCK, SPLIT 5/8			
9	3		1017418-79	74455058079		SCREW, CAP, SOC. HD 5/8-11NC-3A x 2" LG			
8	4		1017418-58	74455058058		SCREW, CAP, SOC. HD. 3/8-16NC-3A x 1 1/4 LG			
7	4		1017424-112	73002505177		PIN, DOWEL			
6	3		MS35690-1010	74431117011		NUT, PLAIN, HEX (JAM)			
5	3		1019218	03386900783		ROD, THREADED			
4	3		1017449-2	16020100220-2		PAD, LEVELING			
3	2		1019220	03386900785		BASE, THREADED			
2	2		1019221	03386900786		RIB			
1	1		1019223	03386900788		PLATE, BASE			

LIST OF PARTS AND MATERIALS

1017383	1017382
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ | DECIMALS ±.005 | ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900153
DRAWN [illegible] DATE 2-7-64
CHECKED J. Schultz 2-14-64
APPROVAL
APPROVAL W. [illegible] 2-17-64
NASA APPROVAL
MIT APPROVAL [illegible] 5/27/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
FIXTURE ASSEMBLY, CERTIFICATION

CODE IDENT NO.
SIZE E
NASA NUMBER 1019760
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

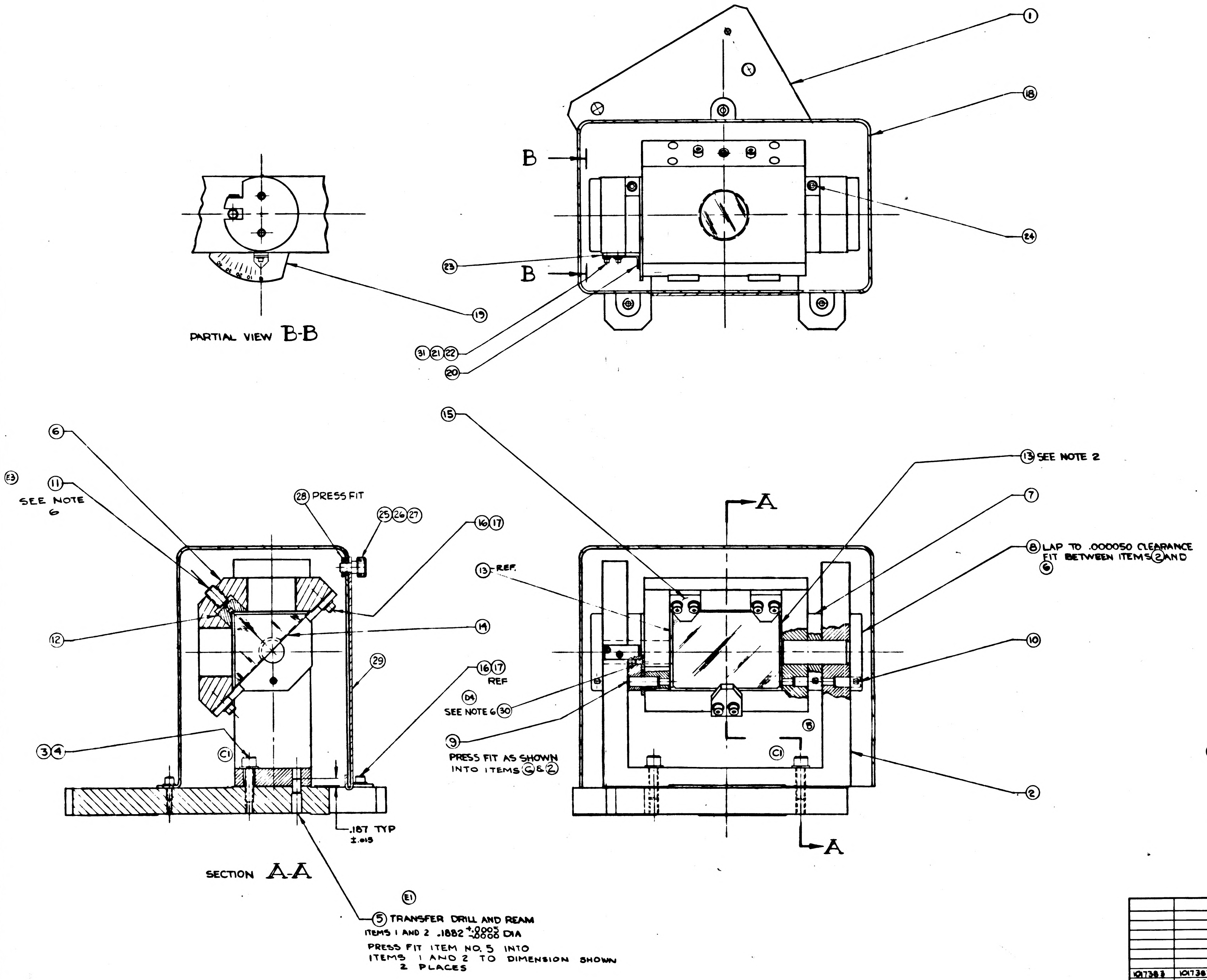
1019760

E | 1019761

SYM	ZONE	REVISIONS ER 08144 DESCRIPTION	DATE	APPROVAL
A		REVISED PER ECP 105976		
B		REVISED PER ECP 104810		
C3		REVISED PER ECP 106781	HEB 8-24-64	
D4		REVISED PER ECP 102667	HEB 10-5-64	
E3		REVISED PER ECP 109426 TDRR 16437 DATE 2-16-65		

NOTES:

1. NTERPRET DWG PER MIL-D-70327
2. EMENT ITEM 13 TO ITEM 6 USING EC826 PER MIL-A-5092 TYPE III
3. DENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019
4. G ERAL MACHINING STANDARDS PER ND1002078 (C2)
5. R BURRS PER ND1002079 (C3)
6. SE WITH LOCTITE PER MIL-S-22473, GRADE B, (D3) PER ND1002211.



B
B
①
⑱
㉔
㉓
⑲
㉛㉑㉒
⑳
PARTIAL VIEW B-B
⑥
E3
⑪
SEE NOTE 6
⑫
③④
C1
㉘ PRESS FIT
㉕㉖㉗
⑯⑰
⑭
㉙
⑯⑰ REF
D4
SEE NOTE 6 ㉚
.187 TYP ±.015
SECTION A-A
E1
⑤ TRANSFER DRILL AND REAM ITEMS 1 AND 2 .1882 +.0005 -.0000 DIA
PRESS FIT ITEM NO. 5 INTO ITEMS 1 AND 2 TO DIMENSION SHOWN 2 PLACES
⑮
⑬-REF.
A
A
⑬ SEE NOTE 2
⑦
⑧ LAP TO .000050 CLEARANCE FIT BETWEEN ITEMS ② AND ⑥
⑩
⑨ PRESS FIT AS SHOWN INTO ITEMS ⑥ & ②
B
C1
②

	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
D2	31	2		AN960-C3	74468051001		WASHER, FLAT			
D1	30	2		AN507C-440-4	61113050416		SCREW, FLAT HEAD (100°)			
	29	1		1019326	03386900892		COVER, DUST			
	28	1		1017424-30	73002505049		PIN, DOWEL			
	27	1		AN960C416L	74468050006		WASHER, FLAT			
	26	1		1019333	03386900898		WASHER, SPRING			
	25	1		1019325	03386900891		PIN, LOCK			
	24	2		1017418-21	74455058021		SCREW, CAP			
	23	1		1019263	03386900823		SPACER			
	22	2		MS35337-77	74439050001		WASHER, LOCK			
	21	2		1017418-2	74455058002		SCREW, CAP, HEX SOC			
	20	1		1019252	03386900815		POINTER			
	19	1		1019251	03386900814		DIAL			
	18	1		1019231	03386900796		COVER, DUST			
	17	9		1017418-18	74455058018		SCREW, CAP, HEX SOC			
	16	9		MS35338-80	74439003004		WASHER, LOCK			
	15	3		1019232	03386900797		CLAMP			
	14	1		1019227	03386900792		PRISM, PORRO			
	13	2		1019236	03386900801		PAD			
	12	1		1019233	03386900798		V- BLOCK			
A	11	2		1017419-3	74471030001		PLUNGER, QUICK RELEASE			
	10	4		1017425-21	74455029020		SCREW, SET			
	9	4		1017415-89	73002105133		PIN, DOWEL			
	8	2		1019234	03386900799		PIN, PIVOT			
	7	2		1019235	03386900800		CLAMP SPACER			
	6	1		1019230	03386900795		HOUSING, PRISM			
E2	5	2		1019384-1	03386901001		PIN, DOWEL			
	4	2		1017418-35	74455058035		SCREW, CAP, HEX SOC			
	3	2		MS35338-82	74439003006		WASHER, LOCK			
	2	1		1019228	03386900793		BRACKET, MOUNTING			
	1	1		1019229	03386900794		PLATE, MOUNTING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017383	1017383
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900154
DRAWN R CARROLL DATE 2/1964
CHECKED
APPROVAL
APPROVAL 2-14-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOUNT ASS'Y
(PORRO PRISM)

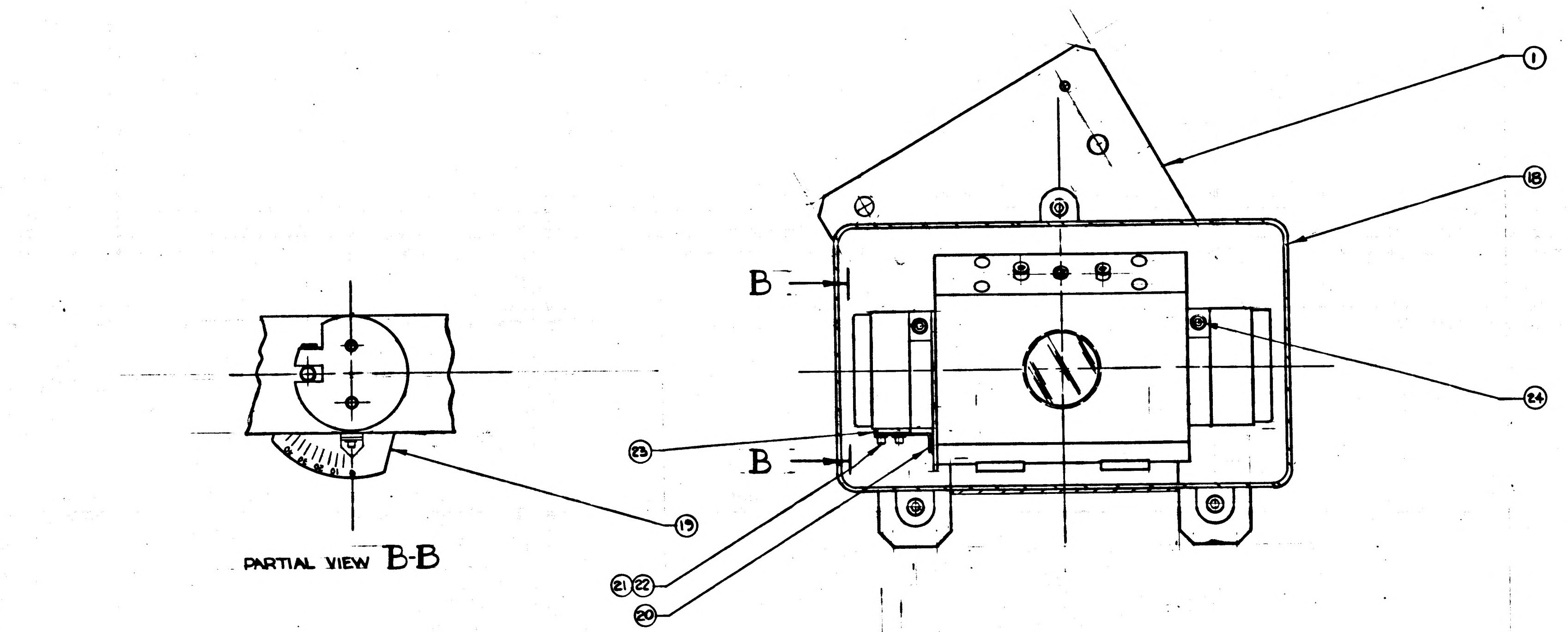
CODE IDENT NO. | SIZE E | NASA NUMBER 1019761
SCALE 1:1 | WEIGHT CALC ACTUAL | SHEET OF

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

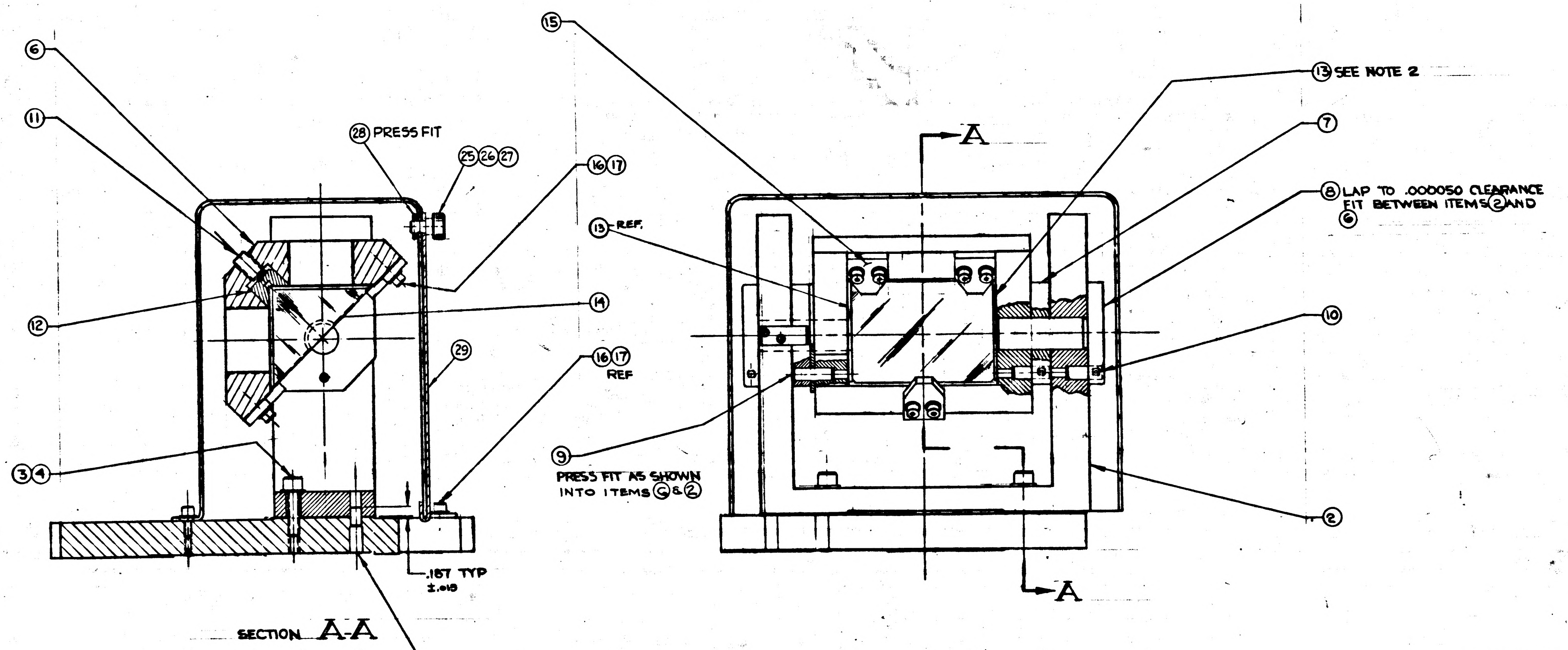
1019761

NOTES:

1. INTERPRET DWG PER MIL-D-70327
2. CEMENT ITEM 13 TO ITEM 6 USING EC826 PER MIL-A-5092 TYPE III
3. IDENTIFY USING NASA PART NO., REV LETTER AND MFRS SYM PER ND1002019



PARTIAL VIEW B-B


⑥
⑪
⑫
③④
㉘ PRESS FIT
㉕㉖㉗
⑯⑰
⑭
㉙
⑯⑰ REF
.187 TYP ±.015
⑮
⑬ REF.
⑬ SEE NOTE 2
⑦
⑧ LAP TO .000050 CLEARANCE FIT BETWEEN ITEMS ② AND ⑥
⑩
⑨
PRESS FIT AS SHOWN INTO ITEMS ⑥ & ②
②
A
A

SECTION A-A

⑤ TRANSFER DRILL AND REAM
ITEM (2) .1882 $^{+.0005}_{-.0000}$ DIA
ITEM (1) .1863 $^{+.0005}_{-.0000}$ DIA
PRESS FIT ITEM NO. 5 INTO
ITEM NO. (1) AS SHOWN

FOR INFORMATION ONLY
CLASS B RELEASE TDR NO 08144 DATE 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	1		1019326	03386900892		COVER, DUST			
28	1		1017424-30	73002505049		PIN, DOWEL			
27	1		AN960C416L	74468050006		WASHER, FLAT			
26	1		1019333	03386900898		WASHER, SPRING			
25	1		1019325	03386900891		PIN, LOCK			
24	2		1017418-21	74455058021		SCREW, CAP			
23	1		1019263	03386900823		SPACER			
22	2		MS35337-77	74439050001		WASHER, LOCK			
21	2		1017418-2	74455058002		SCREW, CAP, HEX SOC			
20	1		1019252	03386900815		POINTER			
19	1		1019251	03386900814		DIAL			
18	1		1019231	03386900796		COVER, DUST			
17	9		1017418-18	74455058018		SCREW, CAP, HEX SOC			
16	9		MS35338-80	74439003004		WASHER, LOCK			
15	3		1019232	03386900797		CLAMP			
14	1		1019227	03386900792		PRISM, PORRO			
13	2		1019236	03386900801		PAD			
12	1		1019233	03386900798		V- BLOCK			
11	2		PENDING	74471050001		PLUNGER, QUICK RELEASE			
10	4		1017425-21	74456029020		SCREW, SET			
9	4		1017415-89	73002105133		PIN, DOWEL			
8	2		1019234	03386900799		PIN, PIVOT			
7	2		1019235	03386900800		CLAMP SPACER			
6	1		1019230	03386900795		HOUSING, PRISM			
5	2		1017416-71	73002105107		PIN, DOWEL			
4	2		1017418-35	74455058035		SCREW, CAP, HEX SOC			
3	2		MS35338-82	74439003006		WASHER, LOCK			
2	1		1019228	03386900793		BRACKET, MOUNTING			
1	1		1019229	03386900794		PLATE, MOUNTING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017383	1017383
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 02386900154
DRAWN R CARROLL DATE 2/14/64
CHECKED
APPROVAL
APPROVAL 2-14-64
NASA APPROVAL 5/5/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

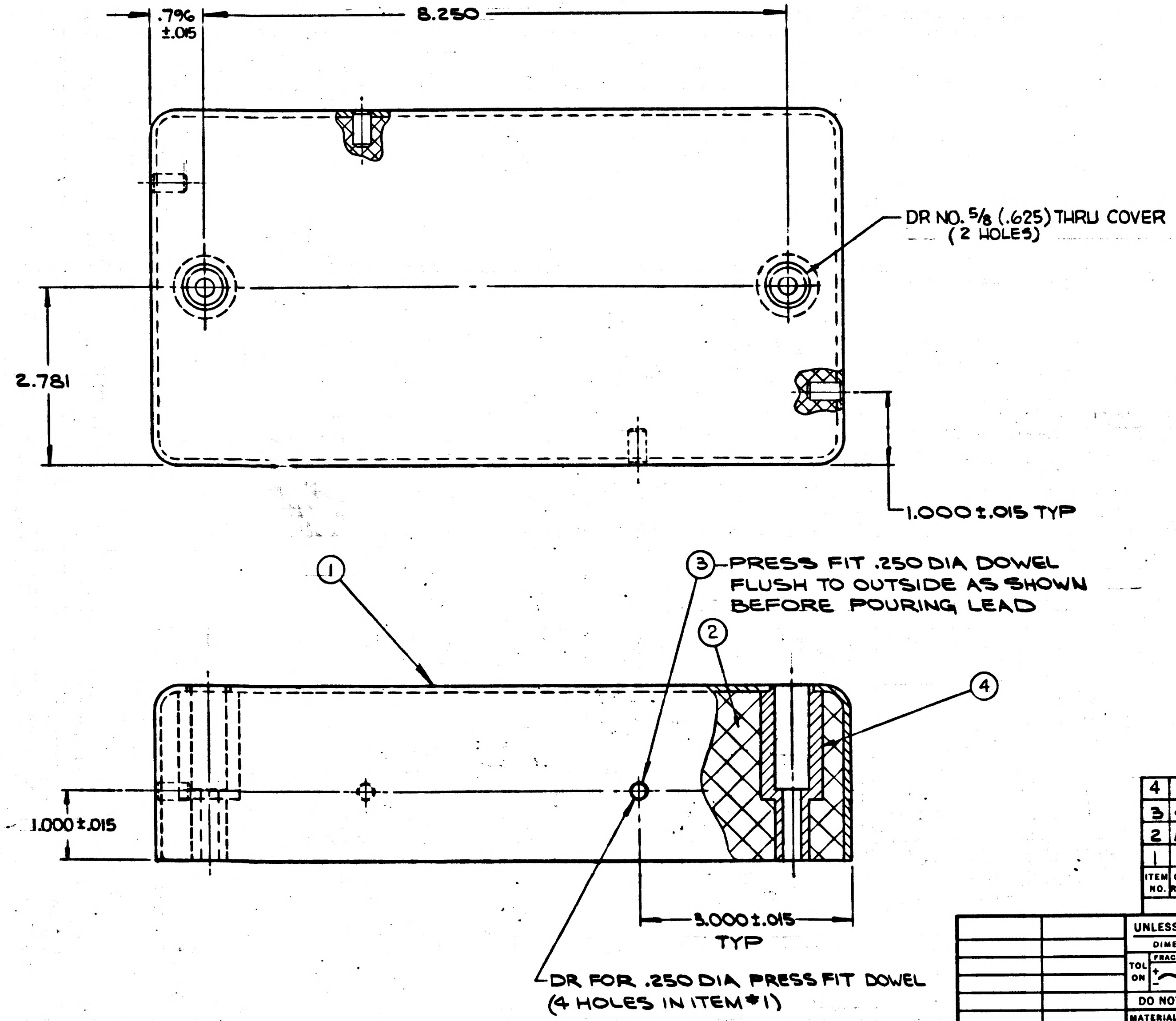
TITLE MOUNT ASS'Y (PORRO PRISM)

CODE IDENT NO.
SIZE E
NASA NUMBER 1019761
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET OF

1019761

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3- REMOVE BURRS IN ACCORDANCE WITH ND1002079
4- FINISH 125 UNLESS OTHERWISE SPECIFIED
5- FILL COVER WITH COMMERCIAL LEAD PER QQ-L-171
6- IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART NO, REV LETTER & MFRS SYM


.796 ±.015
8.250
DR NO. 5/8 (.625) THRU COVER (2 HOLES)
2.781
1.000 ±.015 TYP
①
③ PRESS FIT .250 DIA DOWEL FLUSH TO OUTSIDE AS SHOWN BEFORE POURING LEAD
②
④
1.000 ±.015
3.000 ±.015 TYP
DR FOR .250 DIA PRESS FIT DOWEL (4 HOLES IN ITEM #1)

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08144 **DATE** 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		1019260	03386900821		BUSHING			
3	4		1017415-85	73002105129		PIN, DOWEL .250 DIA x .500 LG.			
2	AR		SEE NOTE #5			LEAD			
1	1		1017461-5	16020110660-5		COVER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ±~ DECIMALS ±.005 ANGLES ±~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900155
DRAWN Binderwar DATE 2-12-64
CHECKED E. Saavatz 2-19-64
APPROVAL 2-19-64
APPROVAL 2-14-64
NASA APPROVAL G.C. 5/1/64
5/1/64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER ASSEMBLY,
COUNTER-BALANCE

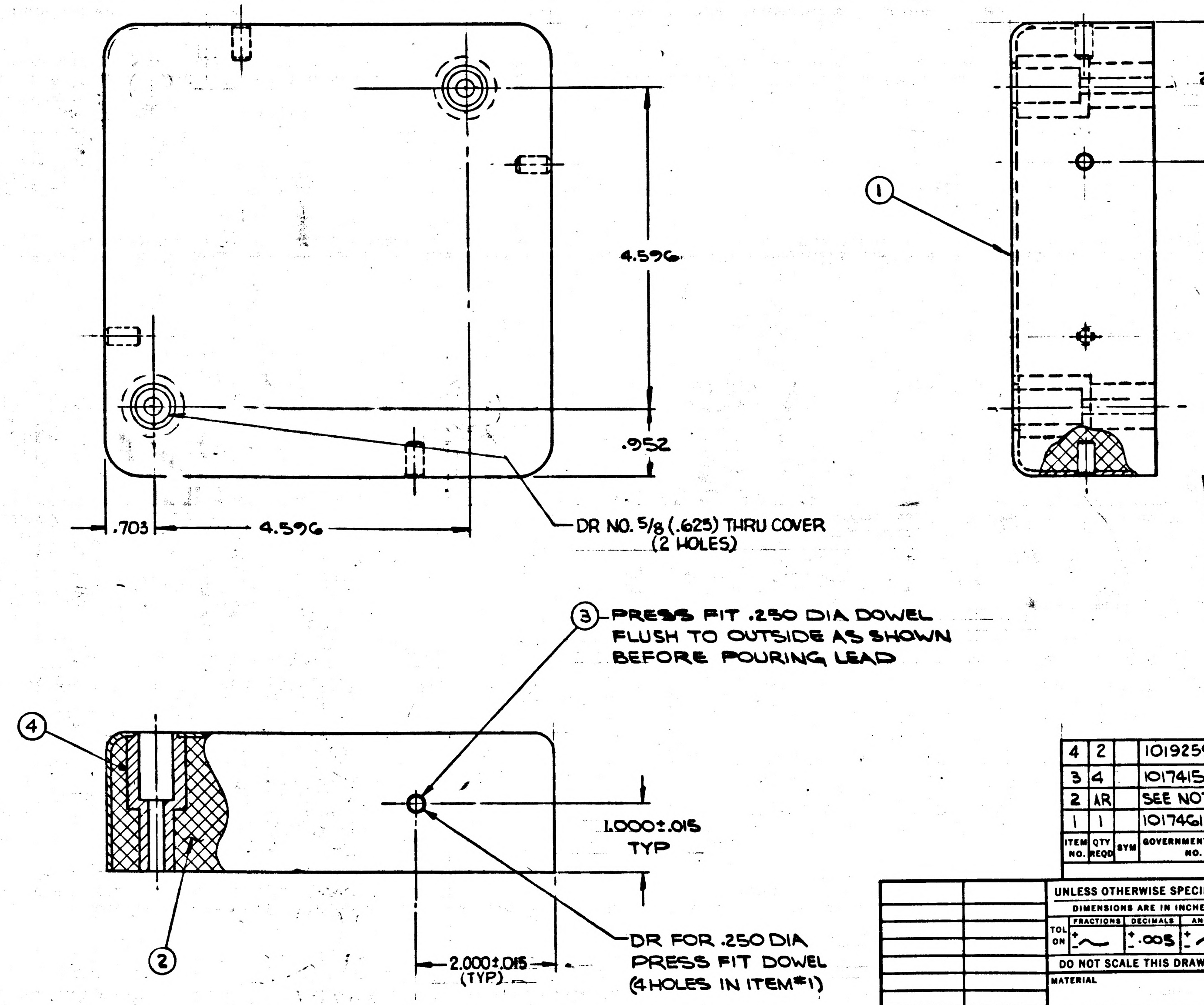
CODE IDENT NO.
SIZE D
NASA NUMBER 1019762
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

1019763

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2-MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3-REMOVE BURRS IN ACCORDANCE WITH 1002079
4-FINISH 125/ UNLESS OTHERWISE SPECIFIED
5-FILL COVER WITH COMMERCIAL LEAD PER QQ-L-171
6-IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART NO, REV LETTER & MFR SYM(KIC)


2.000±.015
TYP
①
4.596
.952
.703
4.596
DR NO. 5/8 (.625) THRU COVER
(2 HOLES)
③ PRESS FIT .250 DIA DOWEL
FLUSH TO OUTSIDE AS SHOWN
BEFORE POURING LEAD
④
1.000±.015
TYP
②
2.000±.015
(TYP)
DR FOR .250 DIA
PRESS FIT DOWEL
(4 HOLES IN ITEM #1)

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08144 DATE 5/5/64

MASTER

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		1019259	03386900820	BUSHING				
3	4		1017415-85	73002105129	PIN, DOWEL .250 DIA x .500 LG				
2	AR		SEE NOTE #5		LEAD				
1	1		1017461-G	16020110660-6	COVER				

APPLICATION	
NEXT ASSY	USED ON
1017382	1017382

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ±~ DECIMALS ±.005 ANGLES ±~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900156
DRAWN Rinebarger DATE 2-13-64
CHECKED E. Sarlage 2-14-64
APPROVAL
APPROVAL [illegible] 2-19-64
NASA APPROVAL G.C. [illegible]
[illegible] 5/1/64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER ASSEMBLY,
COUNTER-BALANCE

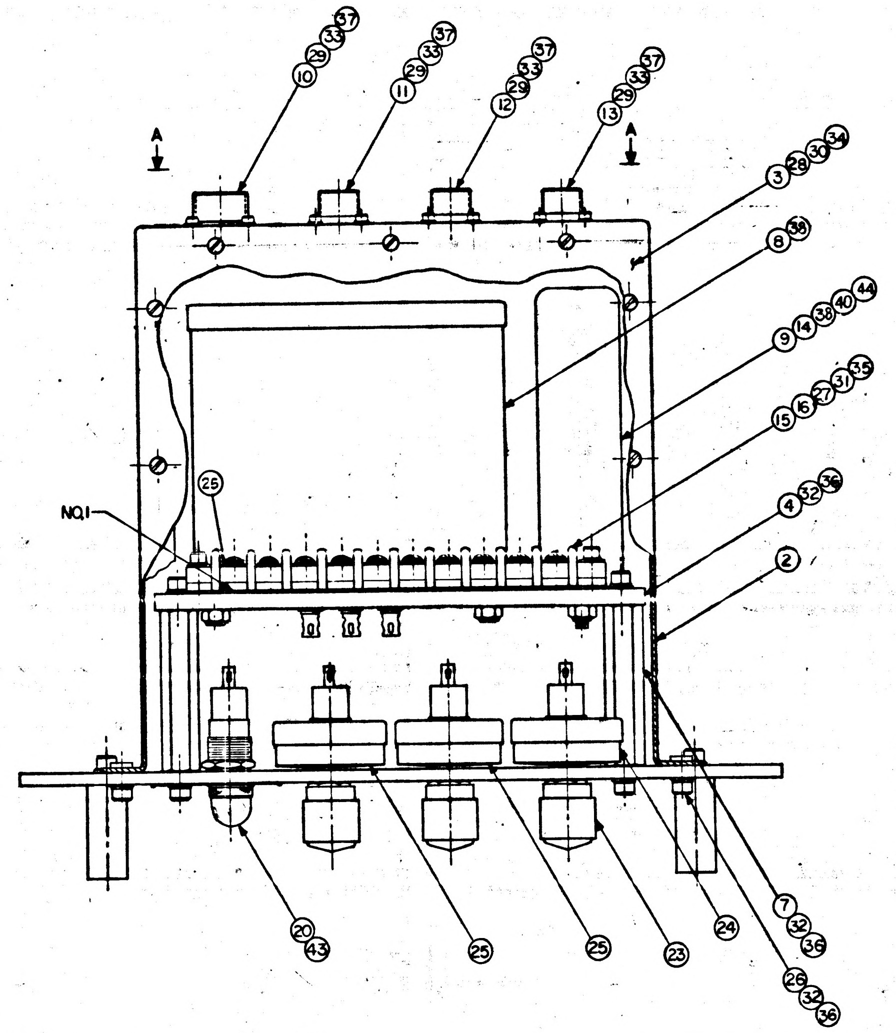
CODE IDENT NO.
SIZE D
NASA NUMBER 1019763
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

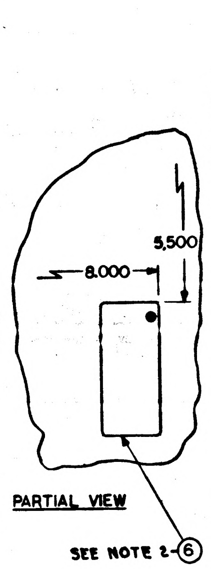
INCHES
0 1 2

1019764

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

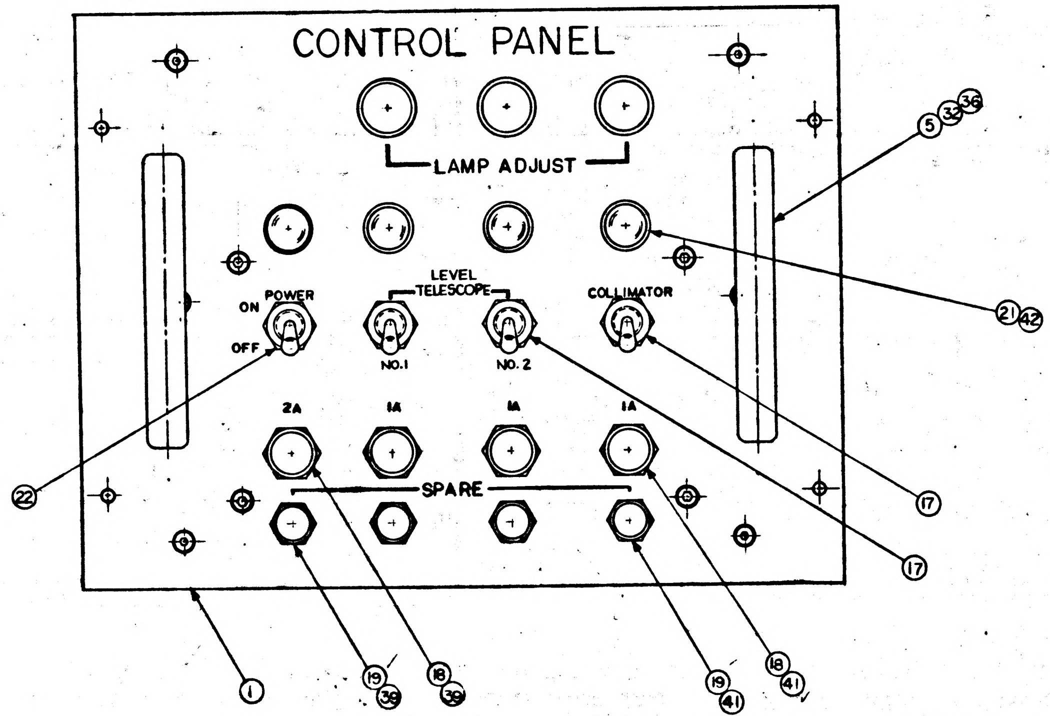
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. APPLY PLATE, IDENTIFICATION NO.1019249 USING EC826 PER MIL-A-5092.
3. IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
4. WIRE TO CONFORM TO ND1002181, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
5. WIRES SHALL BE SPOT TIED APPROX 1/2" APART USING ITEM NO. 69.

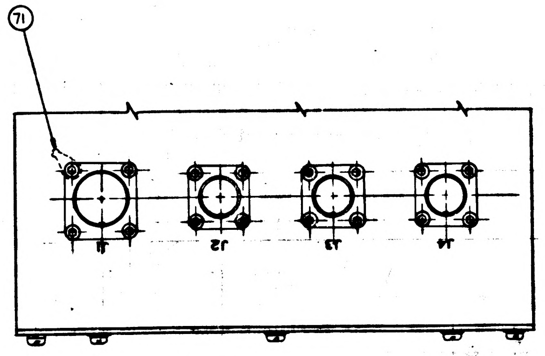




PARTIAL VIEW

SEE NOTE 2-6





PARTIAL VIEW AA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
71	1		1010638-4			TERMINAL LUG			
70			1015894-005			JUMPER-TERMINAL BOARD			
69	AR		1001670-2			TAPE, LACING & TYING			
68	AR		1010490-106			INSULATION, SLEEVING			
67	AR		SEE NOTE 4			WIRE, ELECTRICAL (WHT-BLUE) (AWG 20)			
66						(WHT-GRN) (AWG 20)			
65						(WHT-YEL) (AWG 20)			
64						(WHT-ORN) (AWG 20)			
63						(WHT-RED) (AWG 20)			
62						(WHT-BRN) (AWG 20)			
61						(WHT-BLK) (AWG 20)			
60						(WHT) (AWG 20)			
59						(VIO) (AWG 20)			
58						(BLUE) (AWG 20)			
57						(GRN) (AWG 20)			
56						(YEL) (AWG 20)			
55						(ORN) (AWG 20)			
54						(RED) (AWG 20)			
53						(BRN) (AWG 20)			
52						(BLK) (AWG 20)			
51						(BLK) (AWG 16)			
50						(GY) (AWG 16)			
49						(ORN) (AWG 16)			
48						(RED) (AWG 14)			
47						(GRN) (AWG 14)			
46	AR		SEE NOTE 4			WIRE, ELECTRICAL (ORN) (AWG 14)			
44	2		MS35234-65	74455055065		SCREW, PAN HD (#10)			
43	1		1017463	68257001901		LAMP GLOW			
42	3		1017511-1	68257000701		LAMP			
41	6		MS90079-20	68151000921		FUSE (3AG-1 AMP)			
40	1		1017478	03386900627		SAFETY BOOT			
39	2		MS90078-26			FUSE (3AG-2 AMP)			
38	6		AN363C1032			NUT, PLAIN, HEX, SELF LOCKING #10			
37	16		MS35649-44			NUT, PLAIN, HEX, MACHINE, SCREW NO.4			
36	18		1017479-24	74455059010		SCREW, CAP SOC HD NO.10-32UNF-3A×.500LG			
35	4		1017418-21	74455058020		SCREW, CAP SOC HD NO.8-32UNC-2A×.750LG			
34	9		MS35233-28	74455054028		SCREW, PAN HD, MACHINE SLOTTED NO.6-32UNC-2A×.375			
33	16		1017418-10	74455058010		SCREW, CAP, SOC, HD NO.4-40UNC-2A×.375LG			
32	18		MS35338-81	74439003005		WASHER, LOCK NO.10			
31	4		MS35338-80	74439003004		WASHER, LOCK NO.8			
30	9		MS35338-79	74439003003		WASHER, LOCK NO.6			
29	16		MS35338-78	74439003002		WASHER, LOCK NO.4			
28	9		MS15795-305	74468051003		WASHER, FLAT NO.6			
27	4		MS15795-307	74468051004		WASHER, FLAT NO.8			
26	6		MS15795-308	74468051005		WASHER, FLAT NO.10			
25	16		MS25036-49			TERMINAL, INSULATED			
24			1017499	03386900669		POTENTIOMETER			
23	3		MS91528B-208			KNOB, CONTROL			
22	1		MS25307-22			SWITCH			
21	3		1001669-1	68251002201		LAMP, HOLDER			
20	1		1017465	68251002105		LAMP, HOLDER			
19	4		1001668-2	68152000702		FUSE, HOLDER			
18	4		1001667-6	68152001406		FUSE, HOLDER			
17	3		MS25306-22			SWITCH			
16	1		1001666-10	03386900858		PLATE, DESIGNATION			
15	1		1001665-10	68102002110		TERMINAL BOARD			
14	1		1001664	03386900839		BRACKET, INVERTED			
13	1		MS3122E-12-35X			CONNECTOR, RECEPTACLE, ELECTRICAL (J4)			
12	1		MS3122E-12-35W			CONNECTOR, RECEPTACLE, ELECTRICAL (J3)			
11	1		MS3122E-12-35			CONNECTOR, RECEPTACLE, ELECTRICAL (J2)			
10	1		MS3102R14S-2P			CONNECTOR, RECEPTACLE, ELECTRICAL			
9	1		1017477	03386900626		CAPACITOR, AC. (C1)			
8	1		1017475	03386900625		TRANSFORMER (T1)			
7	4		1019076	03386900608		STAND-OFF			
6	1		1019249	03386900811		PLATE IDENTIFICATION			
5	2		1017493	[illegible]		HANDLE, OVAL			
4	1		1019240	03386900802		PLATE, MOUNTING			
3	1		1019226	[illegible]		PLATE, COVER			
2	1		1019225	03386900790		COVER			
1	1		1019217	03386900182		PANEL, CONTROL			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08144 DATE 5/5/64

MASTER

NEXT ASSY	USED ON
1017383	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900157
DRAWN Al Rhodes DATE 2-14-64
CHECKED Earl Schmitt 2-14-64
APPROVAL
APPROVAL 2-16-64
NASA APPROVAL
MIT APPROVAL

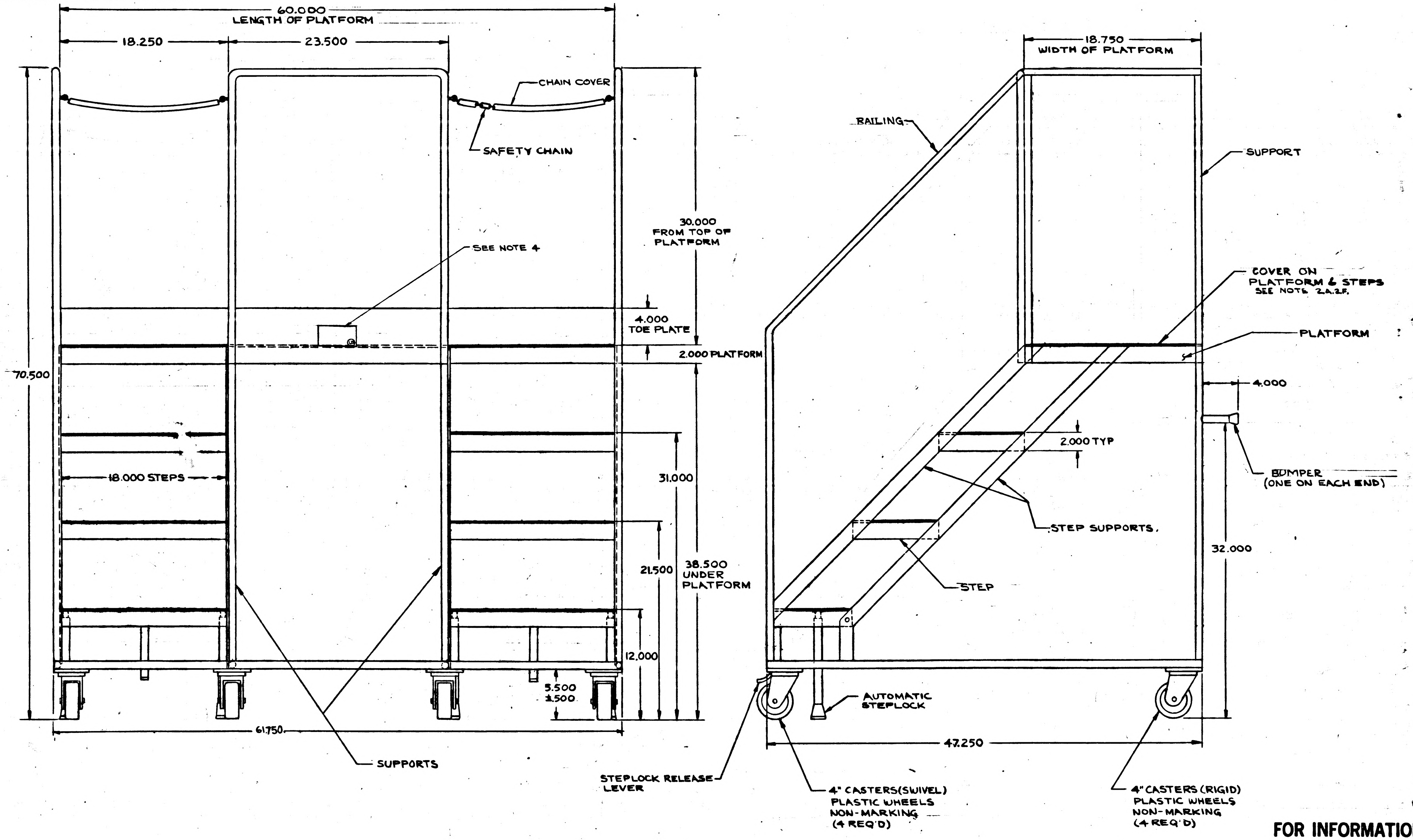
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019764
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES 0 1 2

REQUIREMENTS:
1. GENERAL
   A. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
   B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS B.
2. INSPECTION & ACCEPTANCE
   A. MECHANICAL
      1. DIMENSIONS
      2. MATERIAL:
         A. RAILING & SUPPORTS : AL. ALY. 6063-T6, QQ-A-274.
         B. STEP-SUPPORTS : AL. ALY. 6063-T5, QQ-A-274.
         C. STEP, PLATFORM & TOE-PLATE: AL. ALY. 5052-H34, QQ-A-318.
         D. SAFETY CHAIN : STAINLESS STEEL, 300 SERIES, QQ-S-763.
         E. CHAIN COVER & BUMPER : RUBBER PER MIL-R-3065
         F. STEP & PLATFORM COVER : VINYL FLOOR COVERING.
      3. FINISH
         A. METAL PARTS (EXCEPT CHAIN) & NONMETAL PARTS : NONE
         B. CHAIN : PASSIVATE PER MIL-STD-171; TABLE V-A, P. 5.4.2.
3. WELD (HELI-ARC) PER MIL-W-8604.
4. APPLY IDENTIFICATION PLATE 1019282, USING EC 826, PER MIL-A-5092, AT KIC.
5. IDENTIFY PER ND 1002019.


60.000
LENGTH OF PLATFORM
18.250
23.500
CHAIN COVER
SAFETY CHAIN
SEE NOTE 4
30.000 FROM TOP OF PLATFORM
4.000 TOE PLATE
2.000 PLATFORM
70.500
18.000 STEPS
31.000
21.500
38.500 UNDER PLATFORM
12.000
5.500
3.500
61.750
SUPPORTS
18.750
WIDTH OF PLATFORM
RAILING
SUPPORT
COVER ON PLATFORM & STEPS SEE NOTE 2A.2F.
PLATFORM
4.000
2.000 TYP
BUMPER (ONE ON EACH END)
STEP SUPPORTS
32.000
STEP
AUTOMATIC STEPLOCK
47.250
STEPLOCK RELEASE LEVER
4" CASTERS (SWIVEL) PLASTIC WHEELS NON-MARKING (4 REQ'D)
4" CASTERS (RIGID) PLASTIC WHEELS NON-MARKING (4 REQ'D)

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07882 DATE 27 Apr 64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ±.250 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900151
DRAWN C. Peabody DATE 1-20-64
CHECKED J. [illegible] 1-27-64
APPROVAL
APPROVAL [illegible] 1-27-64
NASA APPROVAL [illegible] 4/21/64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WORK PLATFORM, PORTABLE
SPECIFICATION CONTROL DRAWING

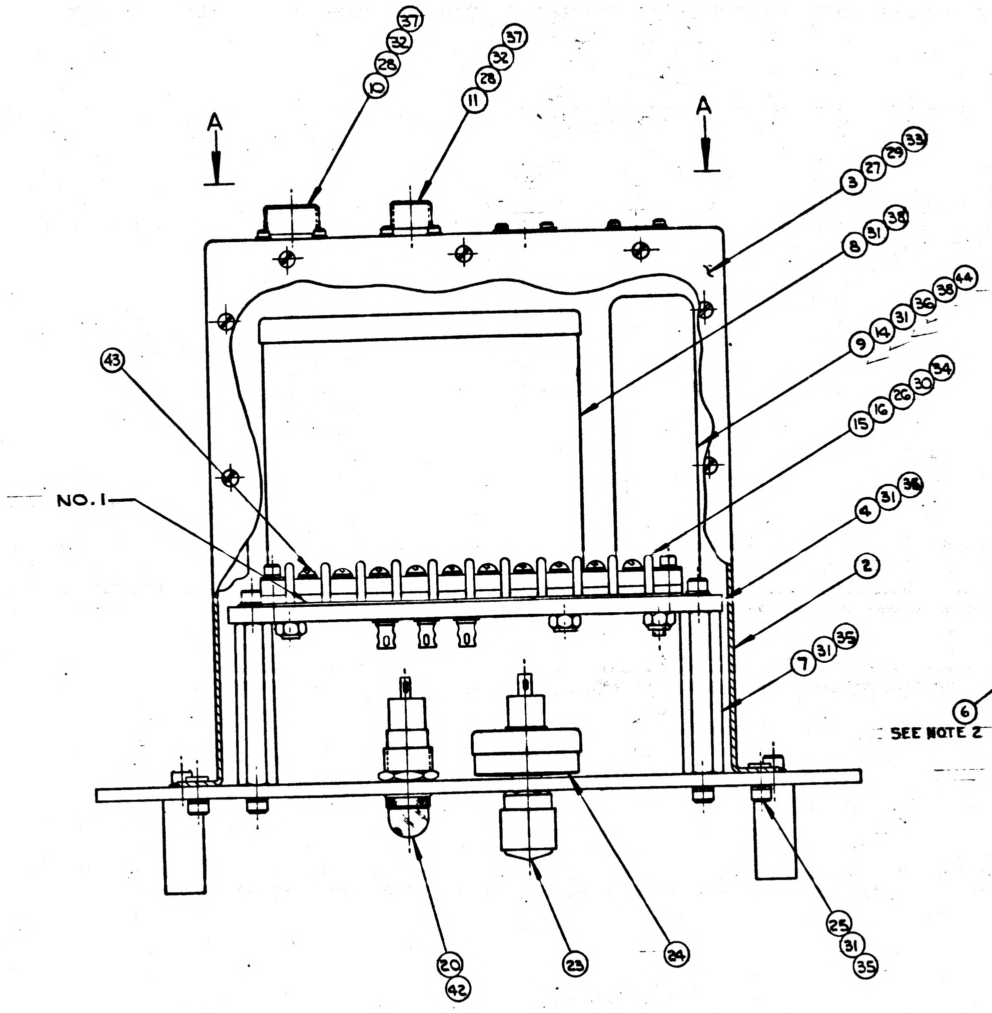
CODE IDENT NO. | SIZE E | NASA NUMBER 1019765
SCALE | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

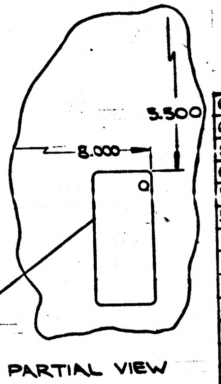
1019765

1019767

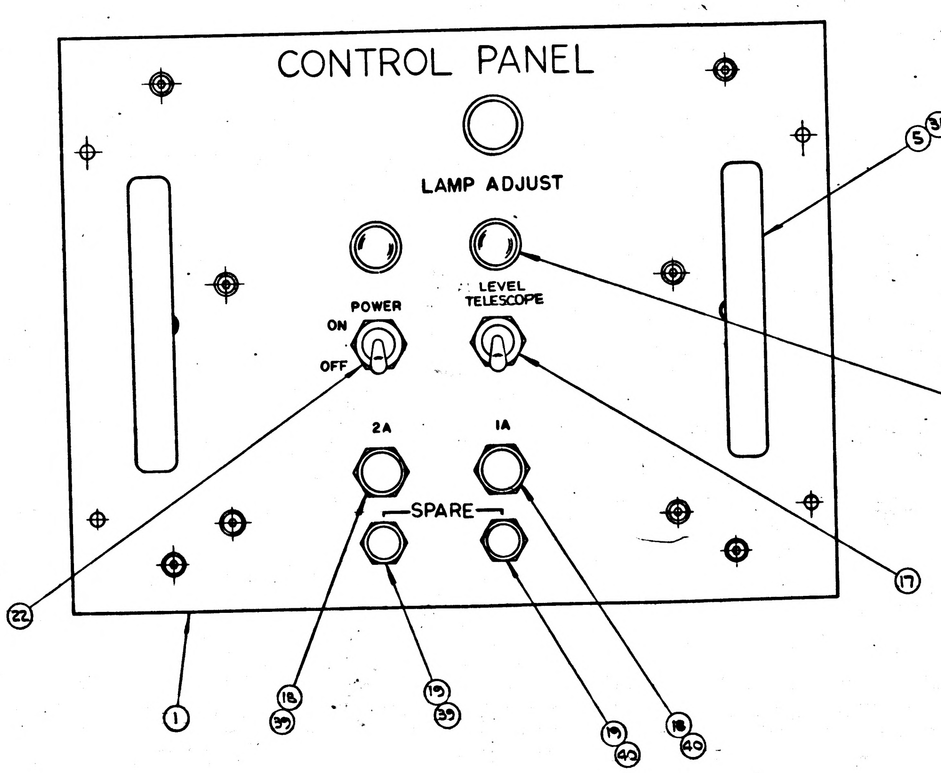
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

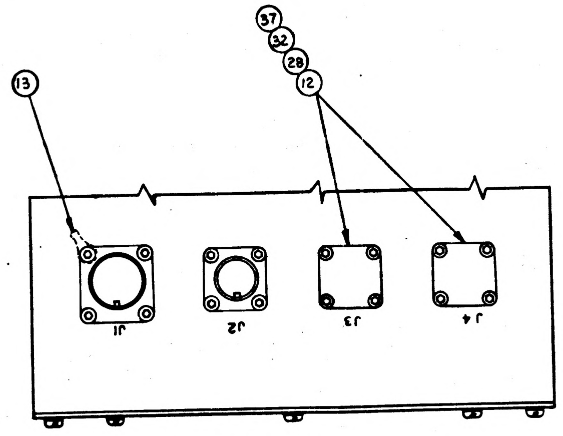
NOTES:
1-INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2-APPLY PLATE, IDENTIFICATION NO. 1019249 USING EC826 PER MIL-A-5092
3-IDENTIFY USING NASA PART NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019
4-WIRE TO CONFORM WITH ND 1002181 TYPE I CLASS 1, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
5-WIRES SHALL BE SPOT TIED APPROX 1/2" APART USING ITEM NO. 61





PARTIAL VIEW





PARTIAL VIEW A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
63	REF		1019731	02386900161		SCHEMATIC DIAGRAM			
62	REF		1019770	02386900164		WIRING DIAGRAM			
61	AR		1011753-	60035037002		TAPE, LACING			
60	AR		1010490-108			INSULATION SLEEVING			
59	AR		SEE NOTE 4			WIRE, ELECTRICAL (WHT-YEL)(AWG NO. 20)			
58	AR					(WHT-BLK)			
57	AR					(VIO)			
56	AR					(BLU)			
55	AR					(GRN)			
54	AR					(YEL)			
53	AR					(RED)			
52	AR					(BRN)			
51	AR					(BLK) (AWG NO. 20)			
50	AR					(BLK) (AWG NO. 16)			
49	AR					(GY) (AWG NO. 16)			
48	AR					(ORN) (AWG NO. 16)			
47	AR					(RED) (AWG NO. 16)			
46	AR					(GRN) (AWG NO. 14)			
45	AR		SEE NOTE 4			WIRE, ELECTRICAL (GRN) (AWG NO. 14)			
44	1		1017478	03386900627		SAFETY BOOT			
43	8		MS25036-49			TERMINAL, INSULATED			
42	1		1017463	68257001901		LAMP, GLOW			
41	1		1017511-1	68257000701		LAMP			
40	2		MS90079-20	68151000921		FUSE (3AG-1AMP)			
39	2		MS90078-26			FUSE (3AG-2AMP)			
38	6		AN363C1032			NUT, PLAIN, HEX, SELF LOCKING #10			
37	16		MS35649-44			NUT, PLAIN, HEX, MACH., SCREW #4			
36	2		MS35234-65	74455053065		SCREW, MACH, PAN HD, SLOTTED (#10-3[illegible]3A x .750)			
35	18		1017479-24	74455059010		SCREW, CAP, SOC. HD. (#10-32 NF-3A [illegible] LG.)			
34	4		1017418-21	74455058020		SCREW, CAP, SOC HD. (#8-32 NC-2A x .750 [illegible]			
33	9		MS35233-28	74455054028		SCREW, PAN HD, MACH. SLOTTED (#6-32 NC-2[illegible] LG)			
32	16		1017418-10	74455058010		SCREW, CAP SOC. HD (#4-40 NC-2A x .375 LG.)			
31	18		MS35338-81	74439003005		WASHER, LOCK (#10)			
30	4		MS35338-80	74439003004		WASHER, LOCK (#8)			
29	9		MS35338-79	74439003003		WASHER, LOCK (#6)			
28	16		MS35338-78	74439003002		WASHER, LOCK (#4)			
27	9		MS15795-305	74468051003		WASHER, FLAT (#6)			
26	4		MS15795-307	74468051004		WASHER, FLAT (#8)			
25	6		MS15795-308	74468051005		WASHER, FLAT (#10)			
24	1		1017499	03386900669		POTENTIOMETER			
23	1		MS91528-2D-2B			KNOB, CONTROL			
22	1		MS25307-22			SWITCH			
21	1		1001669-1	68251002201		LAMP HOLDER			
20	1		1017465	68251002105		LAMP HOLDER			
19	2		1001668-2	68152000702		FUSE HOLDER			
18	2		1001667-6	68152001406		FUSE HOLDER			
17	1		MS25306-22			SWITCH			
16	1		1001666-10	03386900857		PLATE, DESIGNATION			
15	1		1001665-10	68102002110		TERMINAL BOARD			
14	1		1001664	03386900839		BRACKET, INVERTED			
13	1		1010638-4			TERMINAL-LUG			
12	2		1019287	03386900841		PLATE, COVER			
11	1		MS3122E-12-3S			CONNECTOR, RECEPTACLE, ELECTRICAL (J2)			
10	1		MS3102R-14S-2P			CONNECTOR, RECEPTACLE, ELECTRICAL (J1)			
9	1		1017477	03386900626		CAPACITOR, A.C. (C1)			
8	1		1017475	03386900625		TRANSFORMER (T1)			
7	4		1019076	03386900608		STAND-OFF			
6	1		1019332	03386900759		PLATE, IDENTIFICATION			
5	2		1017493	74422003002		HANDLE, OVAL			
4	1		1019240	03386900802		PLATE, MOUNTING			
3	1		1019226	03386900791		PLATE, COVER			
2	1		1019225	03386900790		COVER			
1	1		1019278	03386900834		PANEL, CONTROL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900158
DRAWN DATE 3-11-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019767
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

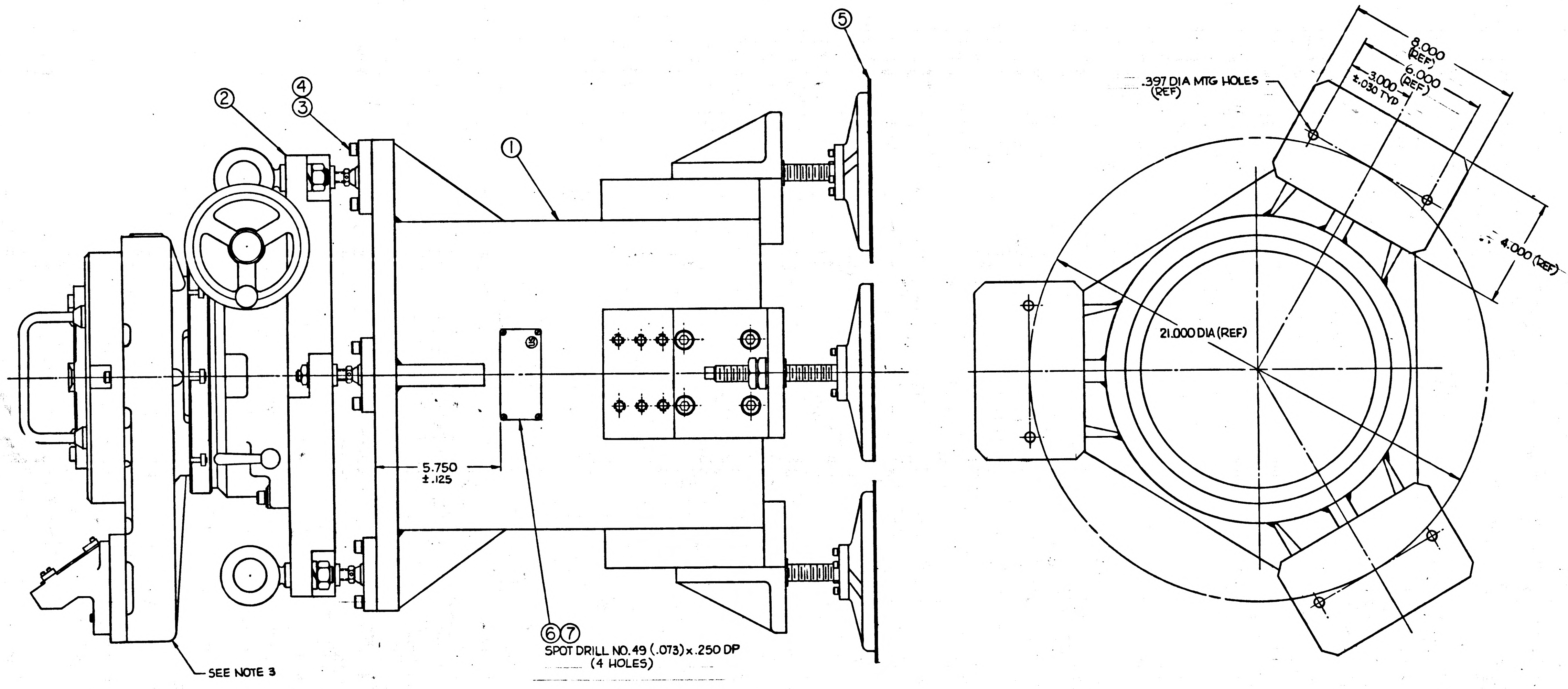
FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08144 DATE 5/5/64

1019769

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) IDENTIFY IN ACCORDANCE WITH ND1002019
3.) ROTARY TABLE SHOWN RCTATED 90° IN AZIMUTH.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08425 DATE 5-13-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	4		MS24646-1	74455075001		SCREW, TAPPING, THREAD CUTTING			
6	1		1019305	16020160020		PLATE, IDENTIFICATION			
5	3		1019295	03386900876		PAD			
4	8		MS35338-84	74439003008		LOCKWASHER (#3/8)			
3	8		1017418-58	74455058058		SCREW, CAP, SOC HD (#3/8-16 x 1¼ LG)			
2	1		1019830	17020160010		ROTARY TABLE & MIRROR ASSY			
1	1		1019777	02386900171		BASE ASSY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020160000
DRAWN C. Bernardy DATE 4-1-64
CHECKED John D. Brigham 4-10-64
APPROVAL
APPROVAL 4-10-64
NASA APPROVAL 5-13-64
5-14-64
MIT APPROVAL 5-14-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT ACCURACY TESTER

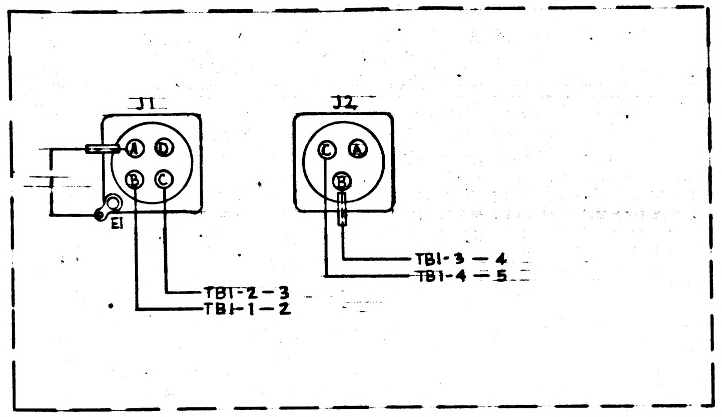
CODE IDENT NO.
SIZE E
NASA NUMBER 1019769
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

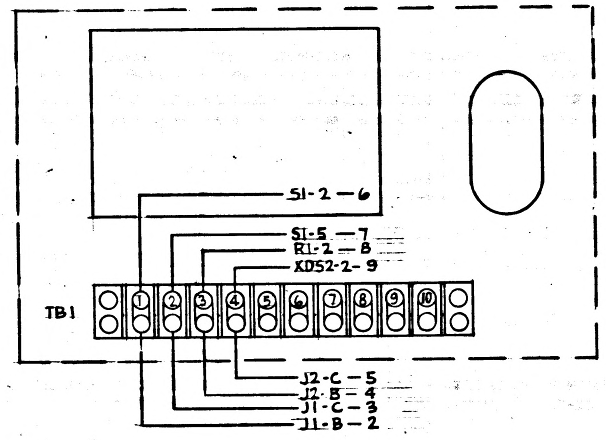
MASTER

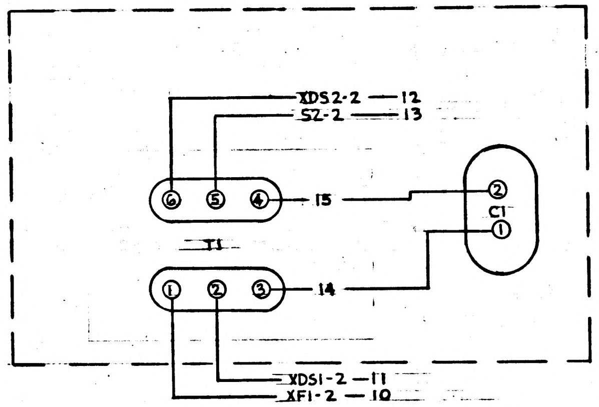
REVISIONS

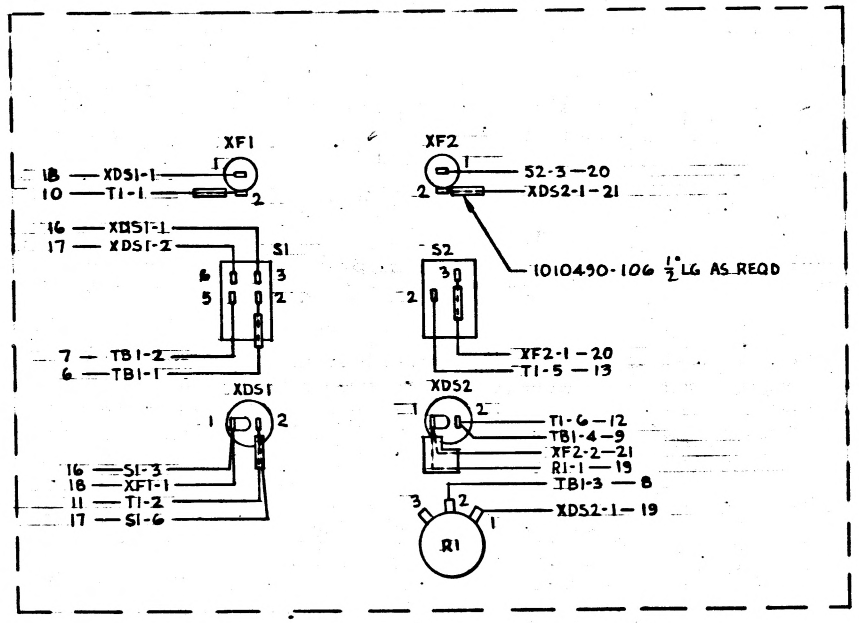
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. BIND WIRES TOGETHER APPROX EVERY 1/2" USING NASA PT NO. Pending AS REQ'D.
4. WIRE TO CONFORM WITH ND 1002181 TYPE I CLASS I, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).


J1
J2
A
B
C
D
E1
TB1-2 — 3
TB1-1 — 2
TB1-3 — 4
TB1-4 — 5


S1-2 — 6
S1-5 — 7
R1-2 — 8
XDS2-2 — 9
TB1
J2-C — 5
J2-B — 4
J1-C — 3
J1-B — 2


XDS2-2 — 12
S2-2 — 13
15
C1
T1
14
XDS1-2 — 11
XF1-2 — 10


XF1
18 — XDS1-1
10 — T1-1
16 — XDS1-1
17 — XDS1-2
S1
7 — TB1-2
6 — TB1-1
XDS1
16 — S1-3
18 — XF1-1
11 — T1-2
17 — S1-6
XF2
S2-3 — 20
XDS2-1 — 21
1010490-106 ½" LG AS REQD
S2
XF2-1 — 20
T1-5 — 13
XDS2
T1-6 — 12
TB1-4 — 9
XF2-2 — 21
R1-1 — 19
TB1-3 — 8
XDS2-1 — 19
R1

COND NO.	PART NO. REF	AWG NO.	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	SEE NOTE 4	20	YEL	AR	J1-A	E1	
2		16	RED		J1-B	TB1-1	
3		16	ORN		J1-C	TB1-2	
4		20	WHT-BLK		J2-B	TB1-3	
5		20	WHT-YEL		J2-C	TB1-4	
6		16	GY		TB1-1	S1-2	
7		16	BLK		TB1-2	S1-5	
8		20	BLU		TB1-3	R1-2	
9		20	WHT-BRN		TB1-4	XDS2-2	
10		20	VIO		T1-1	XF1-2	
11		20	YEL		T1-2	XDS1-2	
12		14	GRN		T1-6	XDS2-2	
13		14	ORN		T1-5	S2-2	
14		20	BLK		T1-3	C1-1	
15		20	BRN		T1-4	C1-2	
16		20	RED		S1-3	XDS1-1	
17		20	GRN		S1-6	XDS1-2	
18		20	BLU		XF1-1	XDS1-1	
19		20	RED		R1-1	XDS2-1	
20		20	BLK		S2-3	XF2-1	
21	SEE NOTE 4	20	YEL	AR	XDS2-1	XF2-2	

REFERENCE DRAWING:
1. SCHEMATIC DIAGRAM 1019731

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 28140 DATE 5/5/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019767	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900164
DRAWN J. MARGIOTTA DATE 3-19-64
CHECKED [illegible] 3-25-64
APPROVAL
APPROVAL [illegible] 3-25-64
NASA APPROVAL [illegible] 5/5/64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CONTROL PANEL ASSY
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019770
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF

MASTER

1019770

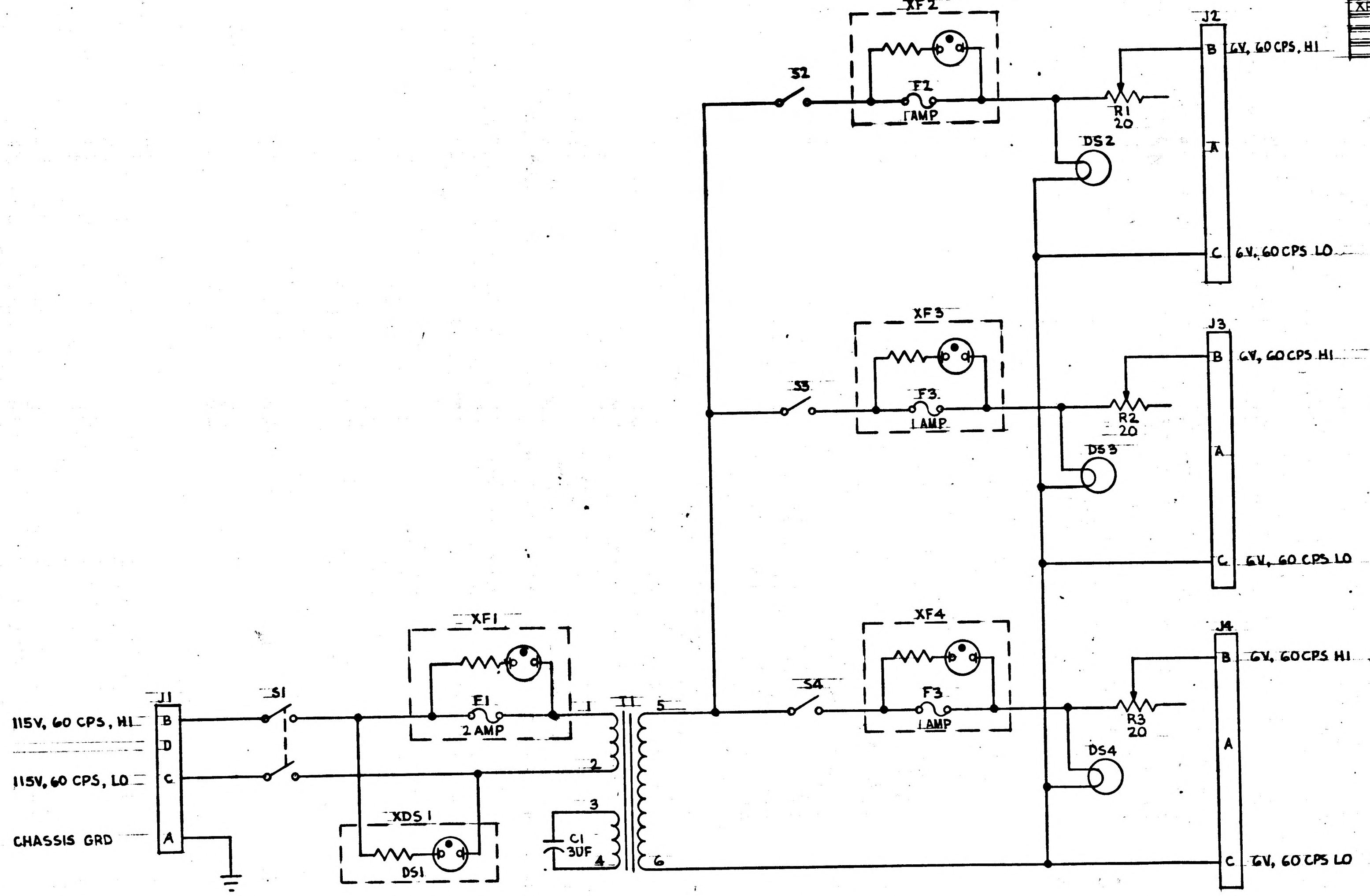
1019772

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. PARTS LIST TO BE FOR REFERENCE ONLY.

REF DESIG	ZONE	SYM	GOVERNMENT/ NASA NO.	KOLLSMAN PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1017477	03386900626	CAPACITOR	3 UF	± 20%	600 V
DS1			1017463	68 25700 1901	LAMP GLOW (NEON)			
DS2			1017511-1	68 25700 0701	LAMP INCANDESCENT			
DS3			1017511-1	68 25700 0701	LAMP INCANDESCENT			
DS4			1017511-1	68 25700 0701	LAMP INCANDESCENT			
F1			MS90078-26		FUSE, CARTRIDGE			2 AMP
F2			MS90079-20		FUSE, CARTRIDGE			1 AMP
F3			MS90079-20		FUSE, CARTRIDGE			1 AMP
F4			MS90079-20		FUSE, CARTRIDGE			1 AMP
J1			MS3102R-14S-2P		CONNECTOR, RECEPTACLE			
J2			MS3122E-12-3S		CONNECTOR, RECEPTACLE			
J3			MS3122E-12-3SW		CONNECTOR, RECEPTACLE			
J4			MS3122E-12-3SX		CONNECTOR, RECEPTACLE			
R1			1017499	03386900669	RESISTOR, VAR	20	± 10%	4 W
R2			1017499	03386900669	RESISTOR, VAR	20	± 10%	4 W
R3			1017499	03386900669	RESISTOR, VAR	20	± 10%	4 W
S1			MS25307-22		SWITCH TOGGLE DPST			
S2			MS25306-22		SWITCH TOGGLE SPST			
S3			MS25306-22		SWITCH TOGGLE SPST			
S4			MS25306-22		SWITCH TOGGLE SPST			
T1			1017475	03386900625	TRANSFORMER			
XDS1			1017465	68 25100 2105	LAMP HOLDER			
XF1			1001667	68 15200 1406	FUSE HOLDER			
XF2			1001667	68 15200 1406	FUSE HOLDER			
XF3			1001667	68 15200 1406	FUSE HOLDER			
XF4			1001667	68 15200 1406	FUSE HOLDER			



REFERENCE DRAWING :
1. WIRING DIAGRAM 1019773

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08144 **DATE** 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019764	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900166
DRAWN J. MARGIOTTA DATE 3-25-64
CHECKED 4-14-64
APPROVAL
APPROVAL
NASA APPROVAL 5/5/64
MIT APPROVAL 5/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

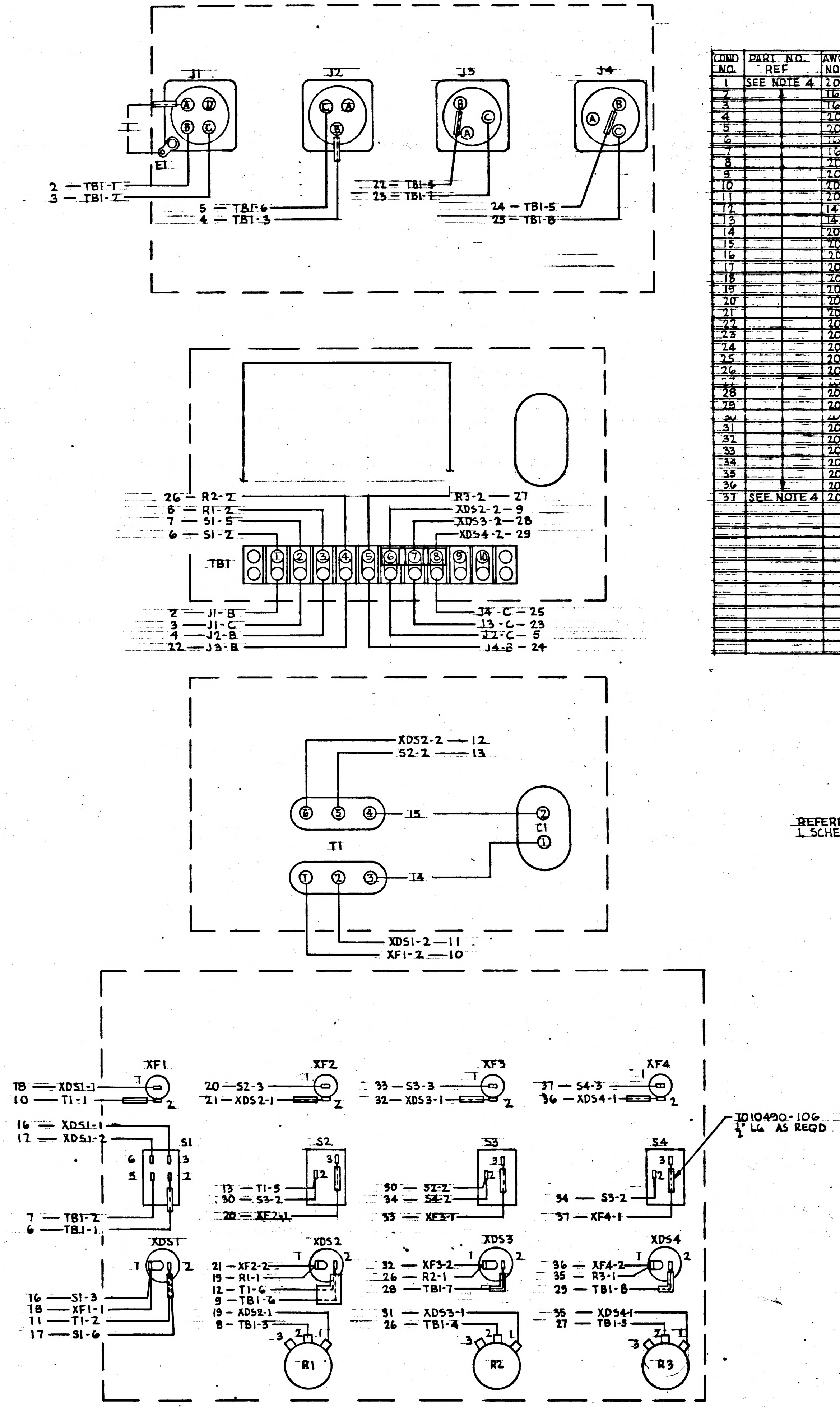
TITLE
CONTROL PANEL ASSY
SCHEMATIC DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019772
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019772

1019773

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. BIND WIRES TOGETHER APPROX EVERY 1/2" USING NASA PART NO. 1001670-2 AS REQD. (REF)
4. WIRE TO CONFORM WITH ND 1002181 TYPE I CLASS I. EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).


J1
J2
J3
J4
E1
A
B
C
D
2 — TB1-1
3 — TB1-2
5 — TB1-6
4 — TB1-3
22 — TB1-4
23 — TB1-7
24 — TB1-5
25 — TB1-8
26 — R2-2
8 — R1-2
7 — S1-5
6 — S1-2
R3-2 — 27
XDS2-2 — 9
XDS3-2 — 28
XDS4-2 — 29
TB1
1
2
3
4
5
6
7
8
9
10
2 — J1-B
3 — J1-C
4 — J2-B
22 — J3-B
J4-C — 25
J3-C — 23
J2-C — 5
J4-B — 24
XDS2-2 — 12
S2-2 — 13
15
C1
T1
14
XDS1-2 — 11
XF1-2 — 10
XF1
XF2
XF3
XF4
18 — XDS1-1
10 — T1-1
20 — S2-3
21 — XDS2-1
33 — S3-3
32 — XDS3-1
37 — S4-3
36 — XDS4-1
16 — XDS1-1
17 — XDS1-2
S1
S2
S3
S4
1D10490-106
1/2" LG AS REQD
13 — T1-5
30 — S3-2
20 — XF2-1
30 — S2-2
34 — S4-2
33 — XF3-1
34 — S3-2
37 — XF4-1
7 — TB1-2
6 — TB1-1
XDS1
XDS2
XDS3
XDS4
16 — S1-3
18 — XF1-1
11 — T1-2
17 — S1-6
21 — XF2-2
19 — R1-1
12 — T1-6
9 — TB1-6
19 — XDS2-1
8 — TB1-3
32 — XF3-2
26 — R2-1
28 — TB1-7
31 — XDS3-1
26 — TB1-4
36 — XF4-2
35 — R3-1
29 — TB1-8
35 — XDS4-1
27 — TB1-5
R1
R2
R3

COND NO.	PART NO. REF	AWG NO.	COLOR	APPROX LENGTH	FROM COMPONENT	TO COMPONENT	SLEEVING REF
1	SEE NOTE 4	20	YEL		J1-A	E1	
2		16	RED		J1-B	TB1-1	
3		16	ORN		J1-C	TB1-2	
4		20	WHT-BLK		J2-B	TB1-3	
5		20	WHT-YEL		J2-C	TB1-6	
6		16	GY		TB1-1	S1-2	
7		16	BLK		TB1-2	S1-5	
8		20	BLU		TB1-3	R1-2	
9		20	WHT-BRN		TB1-6	XDS2-2	
10		20	VIO		T1-1	XF1-2	
11		20	YEL		T1-2	XDS1-2	
12		14	GRN		T1-6	XDS2-2	
13		14	ORN		T1-5	S2-2	
14		20	BLK		T1-3	C1-1	
15		20	BRN		T1-4	C1-2	
16		20	RED		XDS1-1	S1-3	
17		20	GRN		XDS1-2	S1-6	
18		20	BLU		XDS1-1	XF1-1	
19		20	RED		XDS2-1	R1-1	
20		20	BLK		S2-3	XF2-1	
21		20	YEL		XDS2-1	XF2-2	
22		20	YEL		J3-B	TB1-4	
23		20	GRN		J3-C	TB1-7	
24		20	VIO		J4-B	TB1-5	
25		20	WHT		J4-C	TB1-8	
26		20	WHT-RED		TB1-4	R2-2	
27		20	WHT-ORN		TB1-5	R3-2	
28		20	WHT-GRN		TB1-7	XDS3-2	
29		20	WHT-BLU		TB1-8	XDS4-2	
30		20	VIO		S2-2	S3-2	
31		20	BLK		R2-1	XDS3-1	
32		20	BRN		XDS3-1	XF3-2	
33		20	RED		S3-3	XF3-1	
34		20	ORN		S3-2	S4-2	
35		20	YEL		R3-1	XDS4-1	
36		20	GRN		XDS4-1	XF4-2	
37	SEE NOTE 4	20	BLU		S4-1	XF4-1	

REFERENCE DRAWING
1. SCHEMATIC DIAGRAM 1019772

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 07144 DATE 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019764	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900167
DRAWN J.MARGIOTTA DATE 3-26-64
CHECKED 4-24-64
APPROVAL
APPROVAL
NASA APPROVAL 5/1/64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

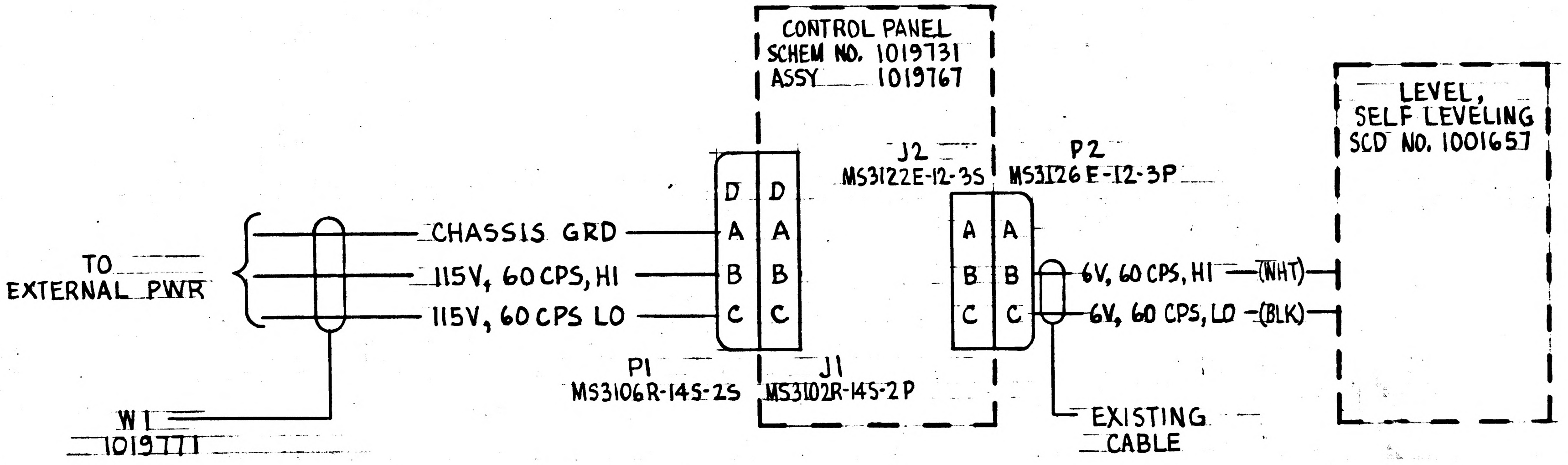
TITLE
CONTROL PANEL ASSY
WIRING DIAGRAM

CODE IDENT NO.
SIZE E
NASA NUMBER 1019773
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019774

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.


CONTROL PANEL
SCHEM NO. 1019731
ASSY 1019767
LEVEL, SELF LEVELING
SCD NO. 1001657
J2
MS3122E-12-3S
P2
MS3126E-12-3P
TO EXTERNAL PWR
CHASSIS GRD
115V, 60 CPS, HI
115V, 60 CPS LO
D D
A A
B B
C C
6V, 60 CPS, HI
(WHT)
6V, 60 CPS, LO
(BLK)
P1
MS3106R-14S-2S
J1
MS3102R-14S-2P
EXISTING CABLE
W1
1019771

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08144 **DATE** 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900168
DRAWN J. MARGIOTTA DATE 4-6-64
CHECKED 4-24-64
APPROVAL
APPROVAL 4-28-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE AZIMUTH REFERENCE FIXTURE INTERCONNECTION DIAGRAM

CODE IDENT NO. SIZE C NASA NUMBER 1019774
SCALE NONE WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

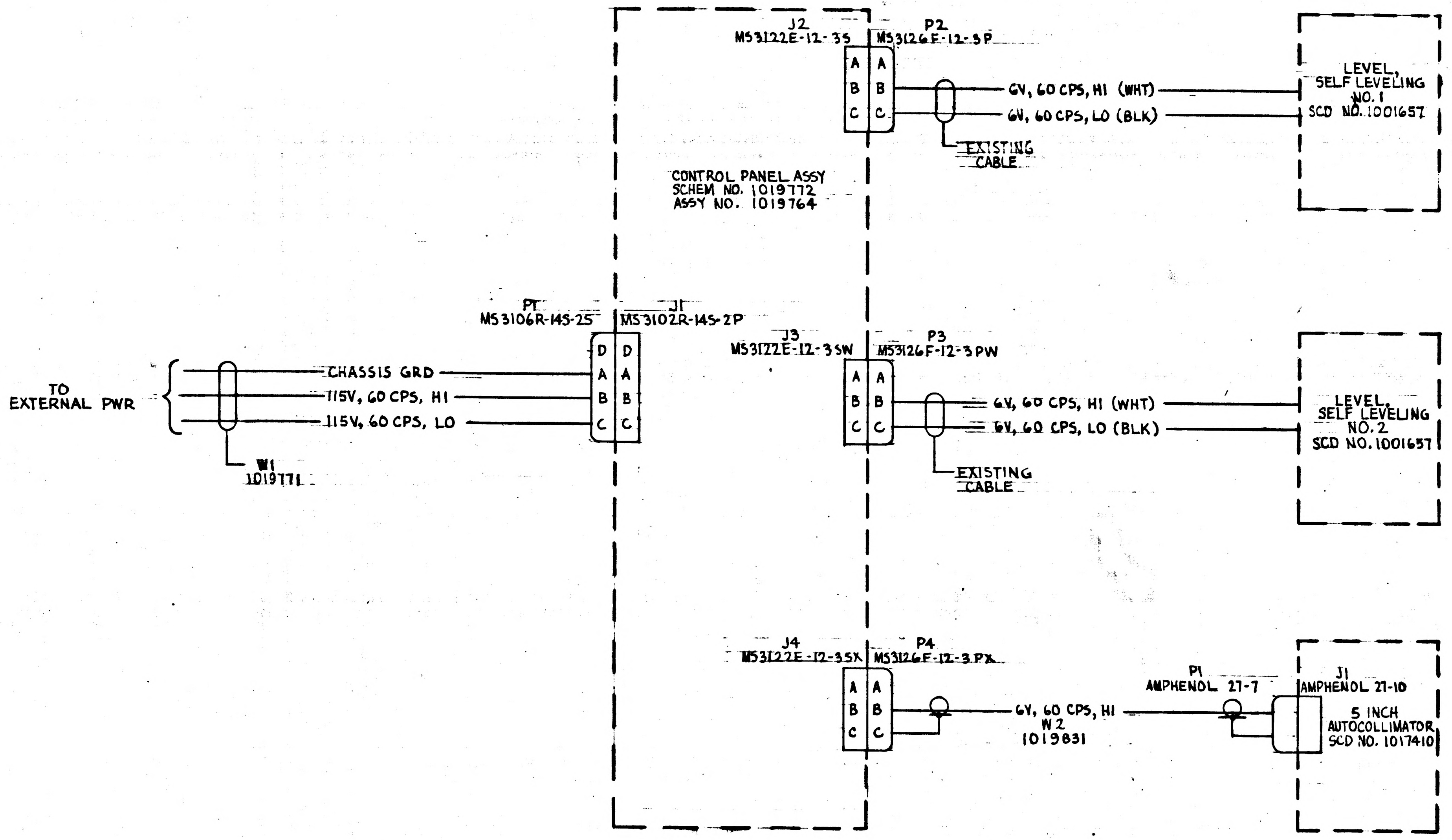
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019775

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


J2
MS3122E-12-3S
P2
MS3126F-12-3P
A A
B B
C C
6V, 60 CPS, HI (WHT)
6V, 60 CPS, LO (BLK)
EXISTING CABLE
LEVEL, SELF LEVELING NO. 1
SCD NO. 1001657
CONTROL PANEL ASSY
SCHEM NO. 1019772
ASSY NO. 1019764
P1
MS3106R-14S-2S
J1
MS3102R-14S-2P
D D
A A
B B
C C
TO EXTERNAL PWR
CHASSIS GRD
115V, 60 CPS, HI
115V, 60 CPS, LO
W1
1019771
J3
MS3122E-12-3SW
P3
MS3126F-12-3PW
6V, 60 CPS, HI (WHT)
6V, 60 CPS, LO (BLK)
EXISTING CABLE
LEVEL, SELF LEVELING NO. 2
SCD NO. 1001657
J4
MS3122E-12-3SX
P4
MS3126F-12-3PX
6V, 60 CPS, HI
W2
1019831
P1
AMPHENOL 27-7
J1
AMPHENOL 27-10
5 INCH AUTOCOLLIMATOR
SCD NO. 1017410

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08144 DATE 5/5/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017383	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900169
DRAWN J. MARGIOTTA DATE 4-6-64
CHECKED B. R. 4-24-64
APPROVAL
APPROVAL 4-24-64
NASA APPROVAL 5/5/64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
G & N INSTALLATION QUALIFICATION
FIXTURE
INTERCONNECTION DIAGRAM

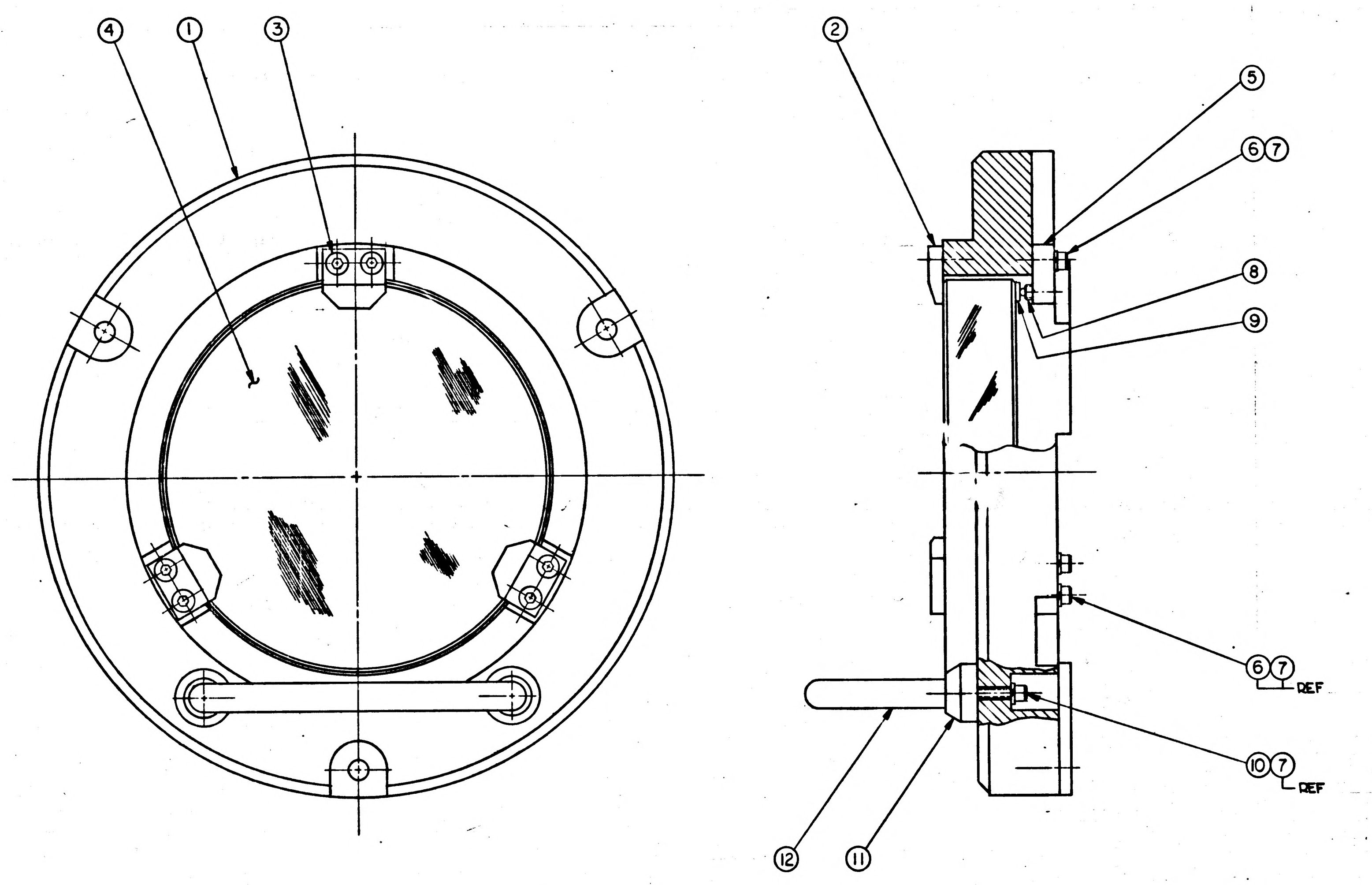
CODE IDENT NO.
SIZE D
NASA NUMBER 1019775
SCALE NONE
WEIGHT CALC ACTUAL
SHEET OF

INCHES 0 1 2

1019776

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
12	1		1016970	03386900042		HANDLE			
11	2		1016965	03386900041		FERRULE			
10	2		1017479-27	7455059013		SCREW, CAP SOC HD			
9	3		1016976	03386900043		PAD			
8	3		1011288-4	74471397004		PLUNGER QUICK RELEASE			
7	8		MS35337-87	74439050005		WASHER, LOCK			
6	6		1017479-25	74455059011		SCREW, CAP SOC HD			
5	3		1016972	03386900035		BLOCK, SUPPORT			
4	1		1019086	03386900618		MIRROR			
3	6		MS35250-72	74455058072		SCREW, MACH, FL. C'SINK HD			
2	3		1016973	03386900036		BLOCK LOCATING			
1	1		1019294	03386900700		HOUSING, MIRROR			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08425 DATE 5-12-64

MASTER

1019769	1019769
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900170
DRAWN A.S. Andolfi DATE 3-27-64
CHECKED 4-13-64
APPROVAL
APPROVAL 4-16-64
NASA APPROVAL 5-12-64
5/11/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE MIRROR MOUNT ASSY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019776
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

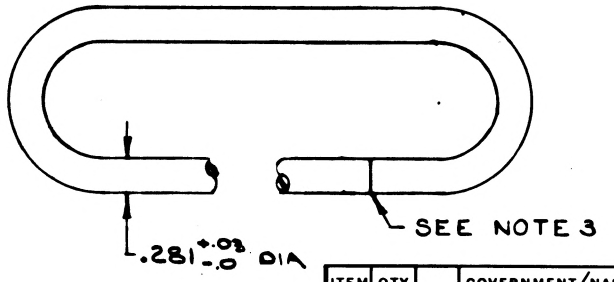
INCHES 0 1 2

1019782 A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER ECP105089 TDRR11284 DATE 5/14/64	6/11/64 J.O	778 6/17/64 WC

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
2. Ⓐ RUBBER "O" RING GASKET, 119 $^{+0}_{-1.000}$ INSIDE CIRCUMFERENCE, PER MIL-R-6855, CLASS II, GRADE 40.
3. BUTT SPLICE ENDS AS SHOWN. JOINT IS TO BE CAPABLE OF WITHSTANDING 13 LB MINIMUM LOAD ACROSS SPLICE, USING VULCANIZING CEMENT "VC 37" (PAWLING RUBBER CO)
4. IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART NO, REV LETTER & MFRS SYM



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08142 **DATE** 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
Ⓐ 1019720	1019720
1019721	1019721

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ —— −	+ —— −	+ —— −

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020170100

DRAWN Z. Z. Ckeelen DATE 23 Mar
CHECKED B Bauer 31 Mar 64
APPROVAL L Mueller 22 APR 64
APPROVAL
NASA APPROVAL R. C. Mills 5/5/64
5/1/64
MIT APPROVAL 5 May 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GASKET

CODE IDENT NO.	SIZE	NASA NUMBER
	B	1019782

SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

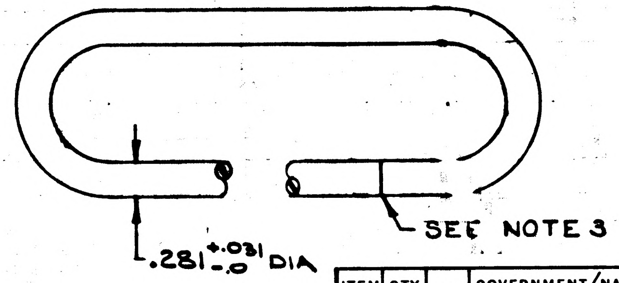
E-153

1019782

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
2. RUBBER "O" RING GASKET, $119^{+0}_{-2.375}$ INSIDE CIRCUMFERENCE, PER MIL-R-6855, CLASS II, GRADE 40.
3. BUTT SPLICE ENDS AS SHOWN. JOINT IS TO BE CAPABLE OF WITHSTANDING 13 LB MINIMUM LOAD ACROSS SPLICE, USING VULCANIZING CEMENT "VC 37" (PAWLING RUBBER CO)
4. IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART No, REV LETTER & MFRS SYM



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08142 **DATE** 5/5/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019721	1019721
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ ___ −	+ ___ −	+ ___ −

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020170100

DRAWN DATE 23 MAR 64
CHECKED B Bauer 31 MAR 64
APPROVAL 22 APR 64
APPROVAL
NASA APPROVAL 5/5/64
5/1/64
MIT APPROVAL 5 May 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GASKET

CODE IDENT NO.	SIZE	NASA NUMBER
	B	1019782

SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

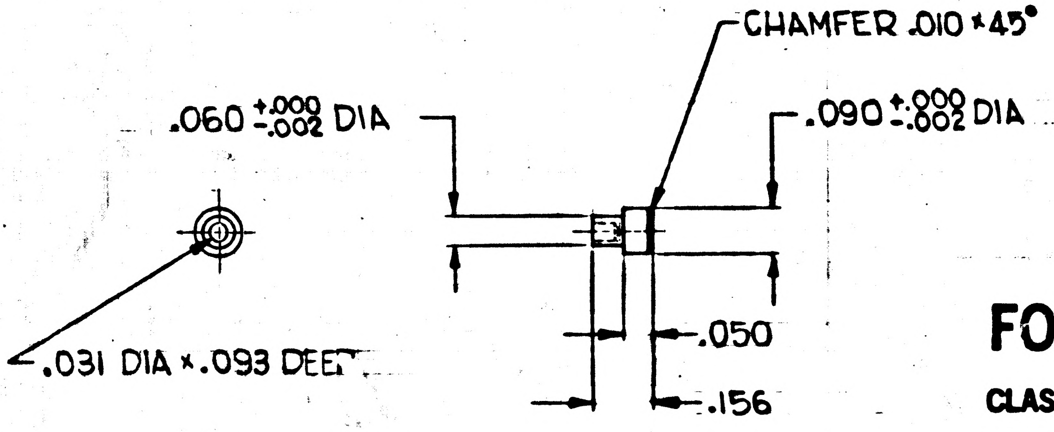
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-GENERAL MACHINING STANDARDS PER ND1002078
3-FINISH 125/ UNLESS OTHERWISE SPECIFIED
4-REMOVE BURRS PER ND1002079
5-BLACKEN PER MIL-C-13924, CLASS 3
6-IDENTIFY USING NASA PART NO. REVISION LETTER
AND MANUFACTURERS SYMBOL PER ND1002019



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 09909 **DATE** 6/3/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

1019786	1019783
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL STAINLESS STEEL AISI 416 FED SPEC QQ-S-763 CLASS 416 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 03386900837

DRAWN A.S. Andolfi DATE 3-11-64
CHECKED EARL SARCATZ 5-19-64
APPROVAL
APPROVAL 6-1-64
NASA APPROVAL 6/3/64
6/3/64
MIT APPROVAL 6/7/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PIN

CODE IDENT NO.	SIZE	NASA NUMBER
	B	1019784

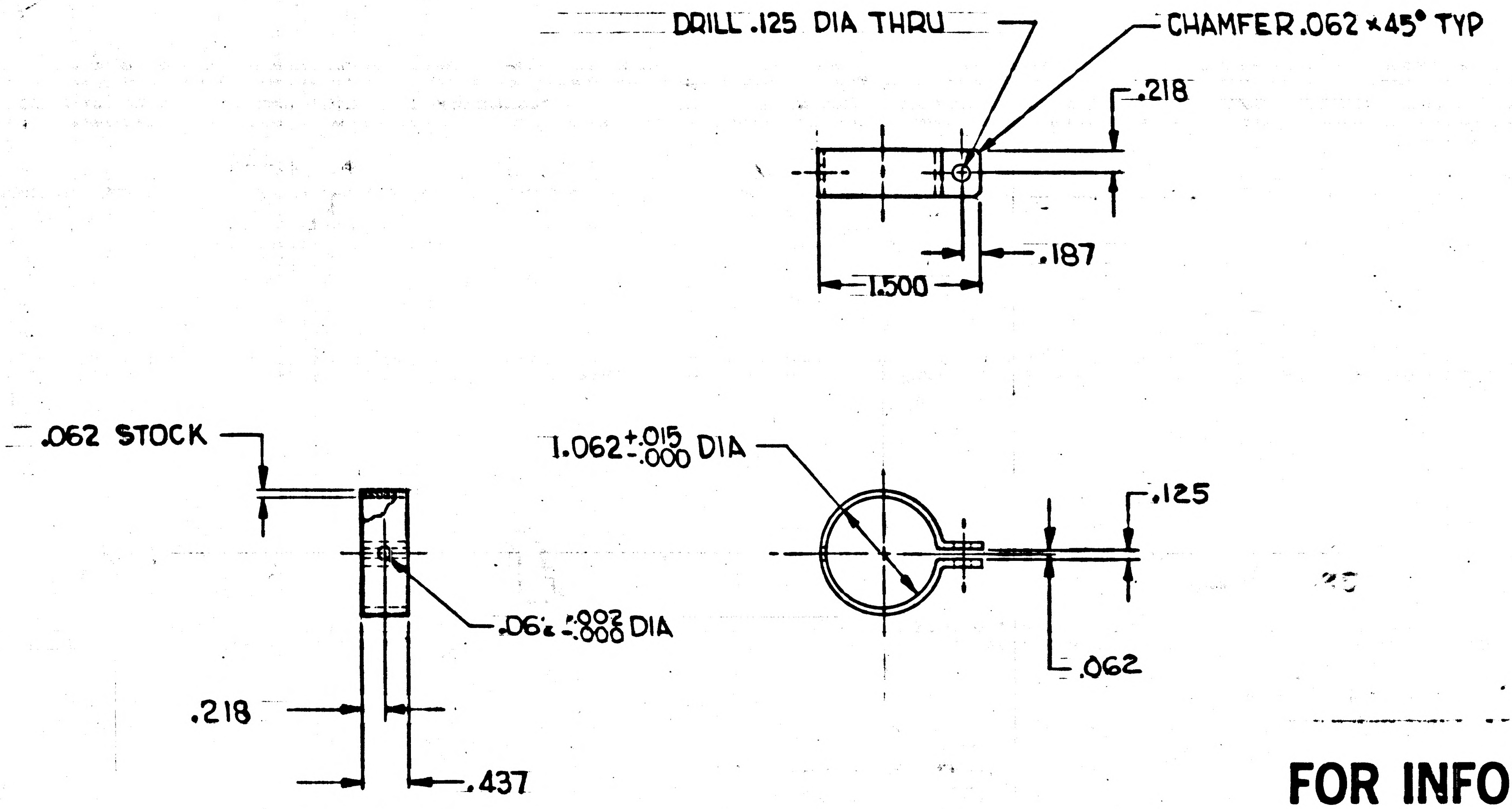
SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-193

1019785

NOTES:
1- INTERPRET DWG PER MIL-D-70327
2- GENERAL MACHINING STANDARDS PER ND1002078
3- FINISH 125/ UNLESS OTHERWISE SPECIFIED
4- REMOVE BURRS PER ND1002079
5- PASSIVATE PER MIL-STD-171 TABLE V-A, PARA 5.4.2
6- IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 09909 DATE 6/3/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019786	1019783

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: FRACTIONS ± ~ DECIMALS ±.010 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL STAINLESS STEEL AISI 316
FED SPEC QQ-S-766 CLASS 316 CON A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 03386900838
DRAWN A.S. Andolfi DATE 3-11-64
CHECKED EARL SARGATZ 5-19-64
APPROVAL
APPROVAL 6-1-64
NASA APPROVAL 6/3/64
6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

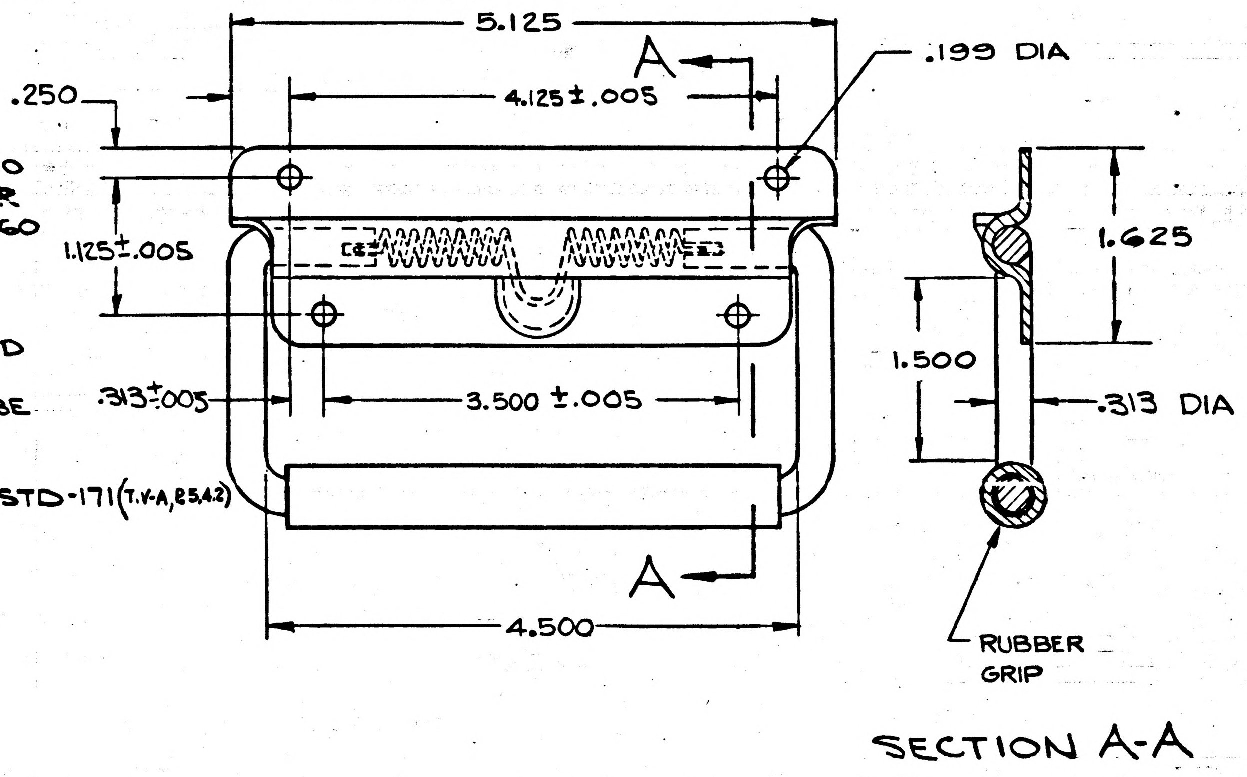
TITLE STRAP

CODE IDENT NO.
SIZE C
NASA NUMBER 1019785
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019797

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REQUIREMENTS:
1. GENERAL
   A) INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
   B) SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 3
2. INSPECTION AND ACCEPTANCE
   A) DIMENSIONS
3. SPECIAL REQUIREMENTS
   A) SPRING LOADED
4. MATERIAL
   A) ALL METAL PARTS- STL AISI-C1010
   B) ALL NON-METAL PARTS-RUBBER PER MIL-R-6855, CLASS II, GRADE 60
   C) SPRING-STAINLESS STL WIRE TYPE 302
5. FINISH
   A) ALL METAL PARTS: CAD. PLATED PER QQ-P-416, CL 2 TYPE II, EXCEPT CHROMATE TREAT TO BE CLEAR
   B) ALL NON-METAL PARTS: NONE
   C) SPRING: PASSIVATE PER MIL-STD-171 (T.V-A, 8.5.4.2)
6. IDENTIFY PER ND1002019.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08138 **DATE** 5/5/64

MASTER

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 16020170070
DRAWN M. Ommes DATE 24 MAR 64
CHECKED B Baur 31 MAR 64
APPROVAL 22 APR 64
APPROVAL
NASA APPROVAL A.C. Mitt, Jr. 5/5/64
5/1/64
MIT APPROVAL 5 May 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HANDLE, FOLDING
SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA NUMBER	
	C	1019797	
SCALE 1:1	WEIGHT	CALC ACTUAL	SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

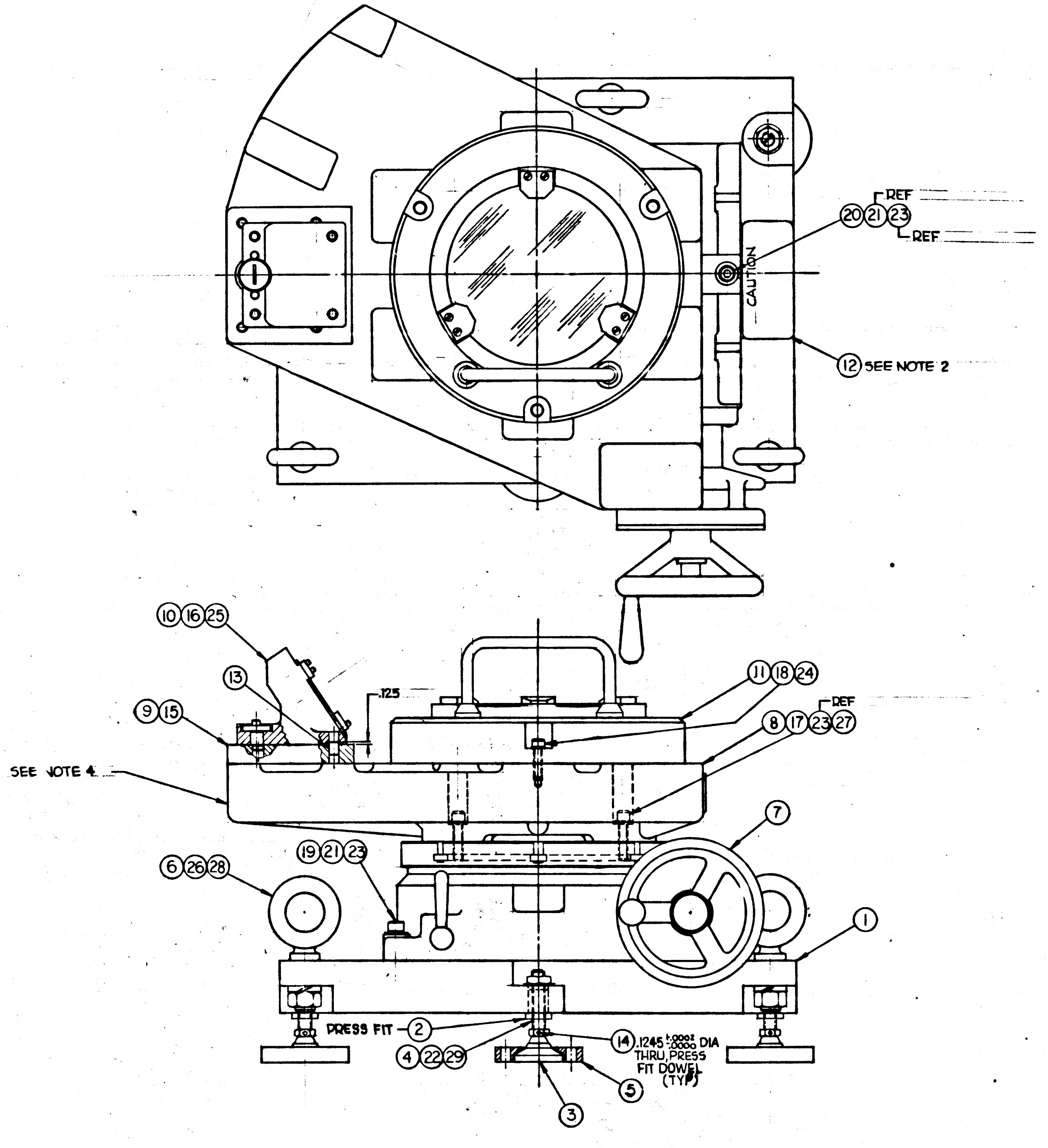
1019797

1019830

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) CEMENT PLATE USING #EC826 CEMENT PER MIL-A-5092.
3.) IDENTIFY PER ND1002019
4.) ROTARY TABLE SHOWN ROTATED 90° IN AZIMUTH



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	3		MS35690-810	61501051080		NUT, PLAIN, HEX			
28	3		MS35690-1210	61501051120		NUT, PLAIN, HEX			
27	4		1017221	03386900592		NUT			
26	3		MS35338-89	74439003013		LOCKWASHER			
25	4		MS35338-81	74439003005		LOCKWASHER			
24	3		MS35338-83	74439003007		LOCKWASHER			
23	7		MS35338-84	74439003008		LOCKWASHER			
22	3		MS15795-318	74468072018		WASHER, FLAT			
21	3		MS15795-314	74468072014		WASHER, FLAT			
20	1		1017418-89	61306056288		SCREW, CAP SOC HD			
19	2		1017418-60	74455058060		SCREW, CAP, SOC HD			
18	3		1017418-47	74455058047		SCREW, CAP, SOC HD			
17	4		1017418-59	74455058059		SCREW, CAP, SOC HD			
16	4		1017479-27	74455059013		SCREW, CAP, SOC HD			
15	4		1017418-36	74455058036		SCREW, CAP, SOC HD			
14	3		1017424-62	73002505093		PIN, DOWEL			
13	1		1017415-111	73002105169		PIN, DOWEL			
12	1		1019300	03386900844		PLATE, CAUTION			
11	1		1019776	02386900170		MIRROR MOUNT ASSY			
10	1		1016920	02386900008		MIRROR MOUNT ASSY			
9	1		1019177	03386900663		PLATE, MOUNTING			
8	1		1019304	03386900635		TURNTABLE, BASE AUX (MACH)			
7	1		1017438	01386900007		ROTARY TABLE ASSY			
6	3		1015916-003			BOLT-EYE, WELDLESS, SHOULDERED			
5	3		1019179	03386900714		RETAINER			
4	3		1019015	16020100190		STUD, THREADED			
3	3		1017449-1	16020100220-1		PAD, LEVELING			
2	3		1019003	16020100070		BUSHING, THREADED			
1	1		1019298	03386900661		JIG PLATE			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08425 DATE 5-12-64

MASTER

NEXT ASSY	USED ON
1019769	1019769

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020160010
DRAWN C. Borowsky DATE 3-31-64
CHECKED [illegible] 4-13-64
APPROVAL
APPROVAL [illegible] 4-30-64
NASA APPROVAL W. J. [illegible] 5-12-64
MIT APPROVAL [illegible] 5-12-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
ROTARY TABLE & MIRROR MTG ASSY

CODE IDENT NO.
SIZE E
NASA NUMBER 1019830
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF

INCHES
0 1 2

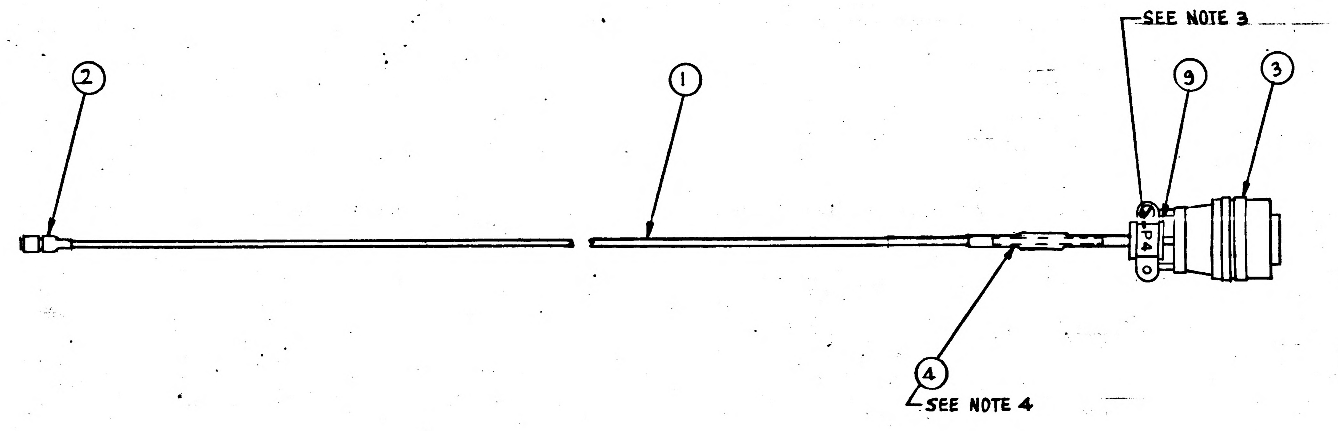
1019831

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

NOTES:
1. INTEPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. WIRE PER ND 1002032
3. MARK PER ND 1002019
4. IDENTIFY USING NASA PART NO. REV LETTER, MFRS SYM AND CABLE NO. (W2) PER ND 1002019
5. WIRE TO CONFORM WITH ND 1002181, EXCEPT FOR SECTION 4 (QUALITY ASSURANCE PROVISIONS).
6. FOR SHIELD WIRES, THE OUTER JACKET COLOR PRECEDES THE SLASH, FOLLOWED BY THE INNER CONDUCTOR INSULATION COLOR.
7. USE ITEM NO. 9 FOR BUILD UP IN ORDER TO INSURE PROPER CLAMPING ON WIRE BUNDLE ENTERING PLUG.

CONDUCTOR					FROM COMPONENT	TO COMPONENT	REFERENCE
NO.	ITEM NO.	COLOR	APPROX LENGTH	ROUTE			
1	1	BLK/CLR	34"		P1	P4-B	SEE FIG. 1
2	5	BLK	3"		SHLD COND 1	P4-C	SEE FIG. 1



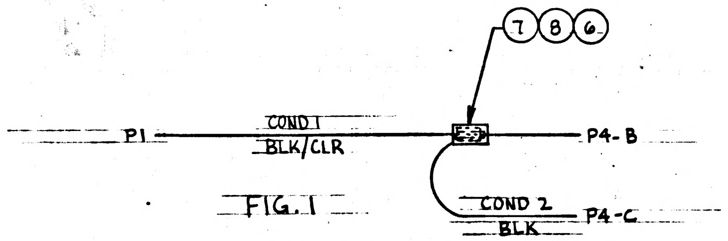
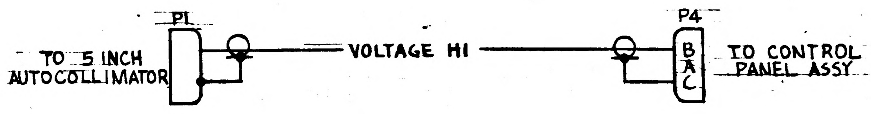


FIG. 1

REFERENCE DRAWING:
1. INTERCONNECTION DIAGRAM - 1019775



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 08144 DATE 5/5/64

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	1		1016282-12			GROMMET, CONNECTOR STRAIN RELIEF			
8	1		1000242-14	7409404 5007		FERRULE (OUTER)			
7	1		1000243-15	7409404 5029		FERRULE (INNER)			
6	1		1010490-140	6002503 5007		INSULATION, SLEEVING (5/8" LG)			
5	3"		SEE NOTE 5			WIRE, ELECTRICAL (BLK) (AWG 22)			
4	1		1010490-470			INSULATION-SLEEVING (2" LG)			
3	1		MS3126F-12-3PX			CONNECTOR, PLUG			
2	1					CONNECTOR, PLUG (AMPHENOL 27-7)			
1	34"		RG-174/U			CABLE, RADIO FREQ, COAXIAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1017383	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ -	+ -	+ -

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900172
DRAWN J. MARGIOTTA DATE 4-6-64
CHECKED B. 4-24-64
APPROVAL
APPROVAL
NASA APPROVAL 5/1/64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL (W2)

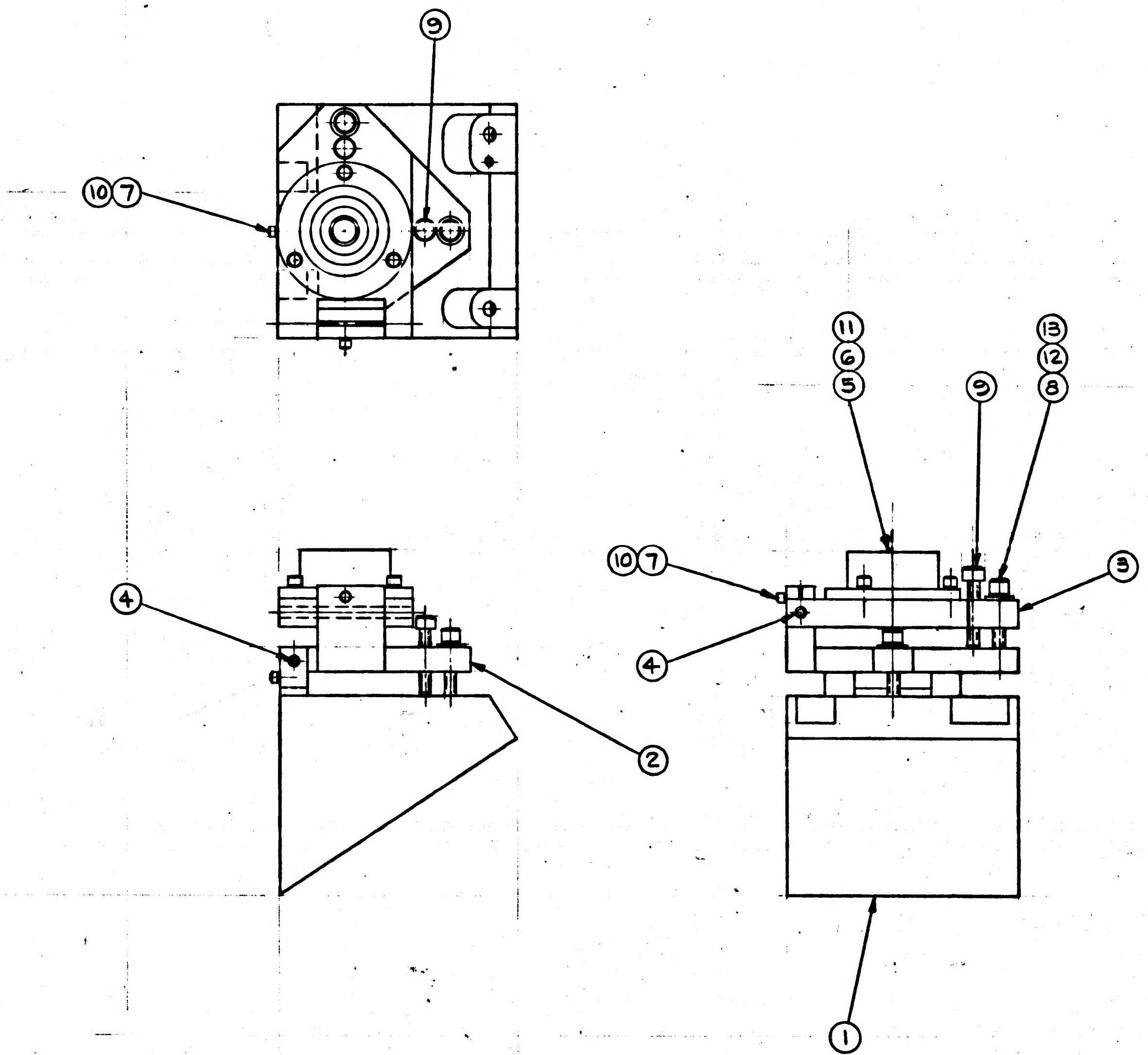
CODE IDENT NO.	SIZE	NASA NUMBER
	D	1019831

SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

1019832

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	2		AN960-C8	74468051004		WASHER, FLAT			
12	2		MS35338-80	74439003004		WASHER, LOCK, SPLIT			
11	3		MS35338-78	74439003002		WASHER, LOCK, SPLIT			
10	2		MS35338-77	74439003001		WASHER, LOCK, SPLIT			
9	2		1017479-21			SCREW, CAP, SOCKET HEAD			
8	2		1017479-22			SCREW, CAP, SOCKET HEAD			
7	2		1017418-3	74455058003		SCREW, CAP, SOCKET HEAD			
6	3		1017418-10	74455058010		SCREW, CAP, SOCKET HEAD			
5	1		1001671	03386900893		LEVEL			
4	2		1019328	03386900894		PIN			
3	1		1019329	03386900895		BLOCK, ADJUSTMENT			
2	1		1019330	03386900896		BLOCK, ADJUSTMENT			
1	1		1019331	03386900897		BLOCK			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 0844 DATE 5/5/64

MASTER

NEXT ASSY	USED ON
1017382	1017382
1017383	1017383

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 02386900174

DRAWN F. PLESCHE DATE 4-23-64

CHECKED C. Barsonly 4-24-64

APPROVAL

APPROVAL

NASA APPROVAL G. C. Dietz

MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LEVEL ASSEMBLY

CODE IDENT NO.
SIZE D
NASA NUMBER 1019832

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

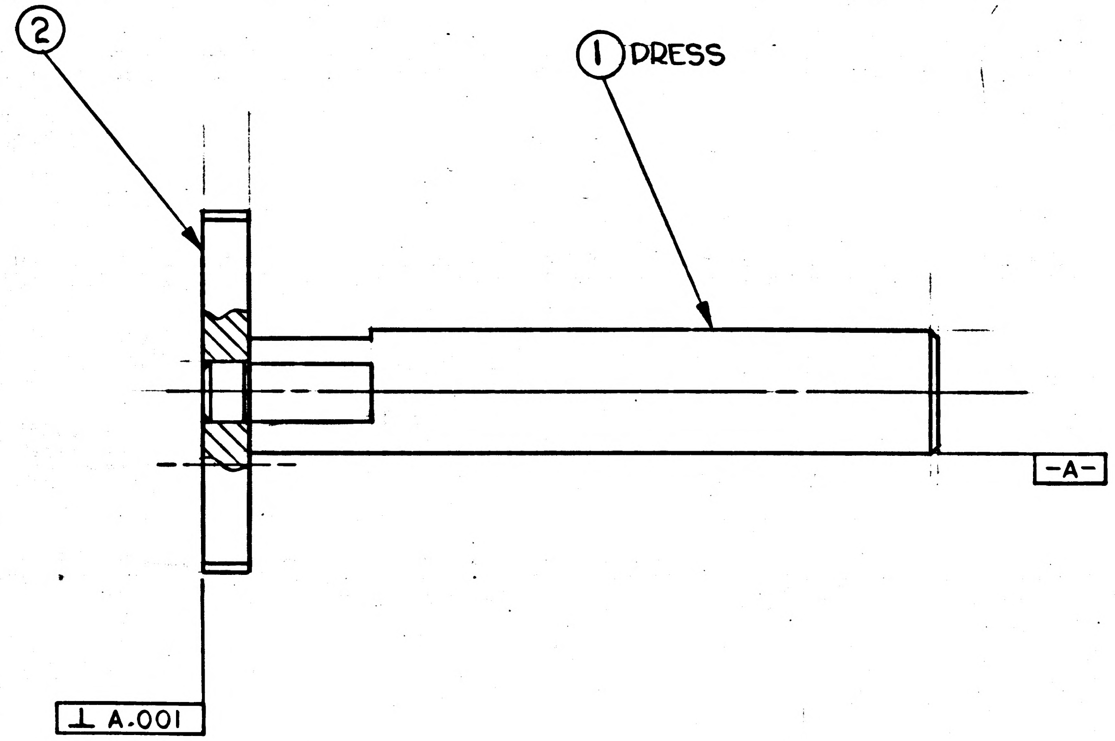
1019832

1019833

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-IDENTIFY PER ND1002019

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 09088 **DATE** 5/27/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		1018998	16020100020		PLATE			
1	1		1019335	03386900902		SHAFT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019760	1019760

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN. 02386900125

DRAWN A.S.Andolff DATE 4-24-64
CHECKED J. Seultz 4-24-64
APPROVAL
APPROVAL 4-24-64
NASA APPROVAL
MIT APPROVAL L Kolgl 5/27/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT ASSY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019833

SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1340

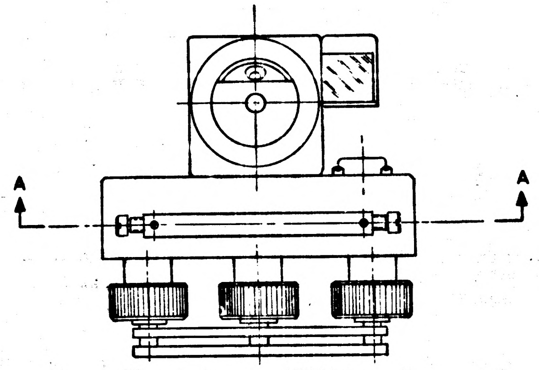
02386900125 1019833

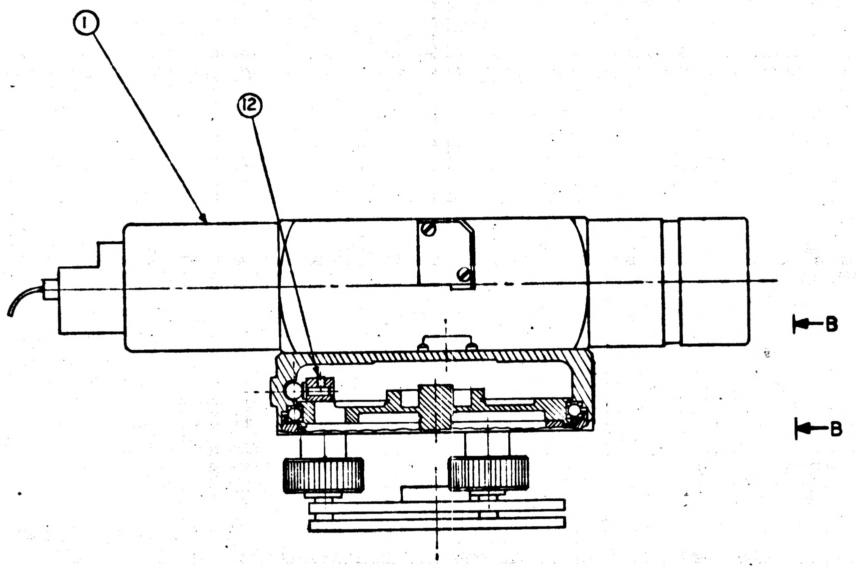
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

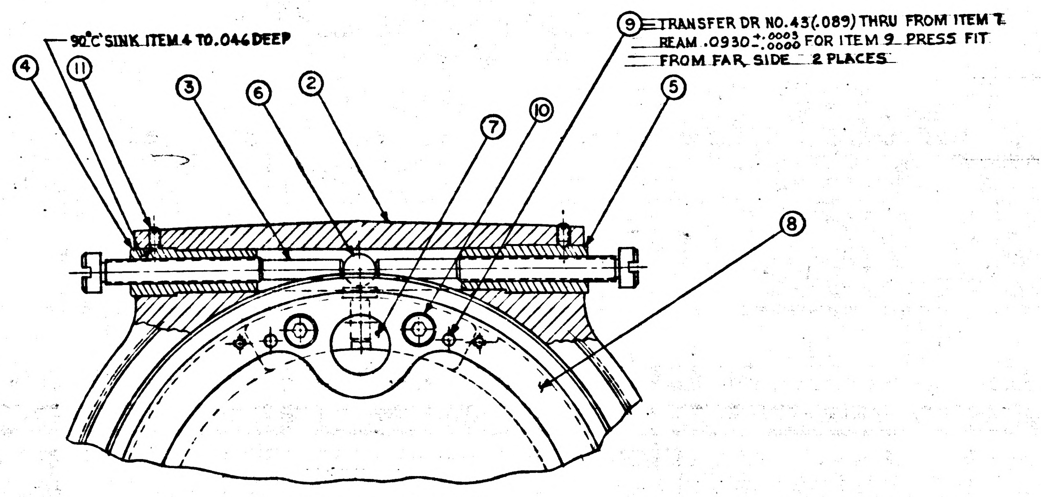
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

1019835

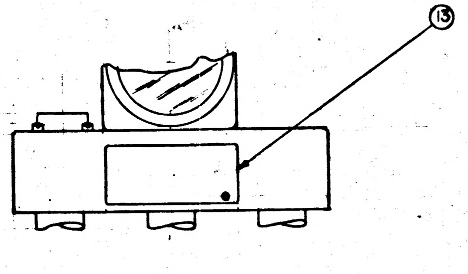
NOTES:
1-INTERPRET DWG INACCORDANCE WITH MIL-D-70327.
2-IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.






90°C'SINK ITEM 4 TO .046 DEEP
⑨ TRANSFER DR NO. 43(.089) THRU FROM ITEM 7.
REAM .0930 +.0003 -.0000 FOR ITEM 9 PRESS FIT
FROM FAR SIDE 2 PLACES
④
⑪
③
⑥
②
⑦
⑩
⑤
⑧

PARTIAL SECTION AA
SCALE: 2:1



VIEW BB

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1		1019344	03386900912		PLATE, IDENTIFICATION			
12	1		AN565B4-3			SETSCREW			
11	2		AN565B4-4			SETSCREW			
10	2		1017418-14	74455058014		SCREW, CAP, SOCKET HD (NO. 6-32UNC-3A × 1/2)			
9	2		1017415-45	73002105069		PIN, DOWEL			
8	1		1019342	03386900909		LEVEL, HOUSING BASE ALTER			
7	1		1019338	03386900905		PLATE			
6	1		1001676	03386900910		PIN			
5	1		1019340	03386900907		BUSHING			
4	1		1019339	03386900906		BUSHING			
3	2		1019341	03386900908		SCREW, ADJUSTING			
2	1		1019343	03386900911		BASE, REWORK			
1	1		1001657	01386900027		LEVEL, SELF LEVELING			

LIST OF PARTS AND MATERIALS

1017382	1017382
1017383	1017383
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900177
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 5-13-64
NASA APPROVAL
MIT APPROVAL

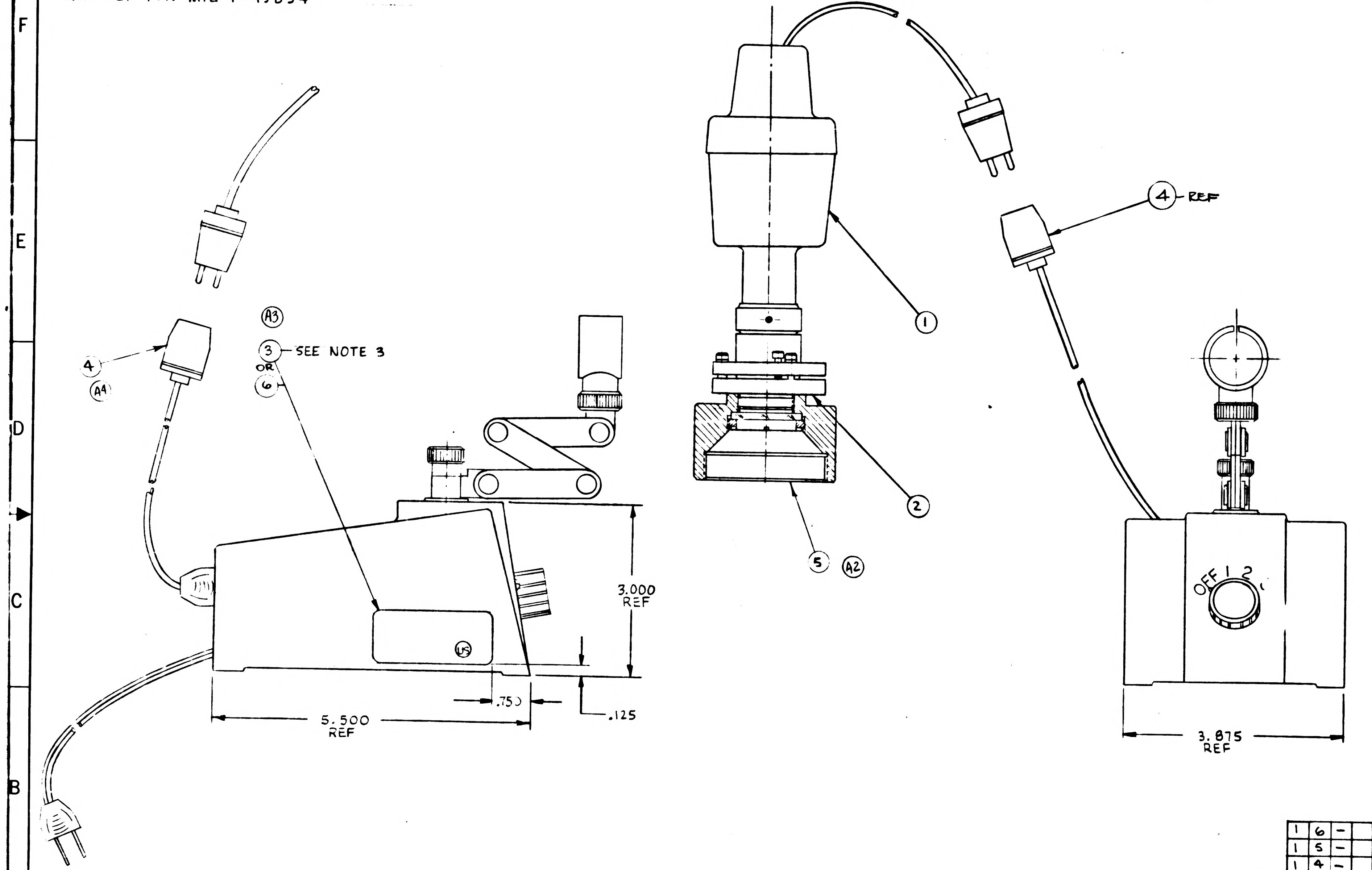
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
AUTOMATIC OPTICAL LEVEL
CODE IDENT NO.
SIZE E
NASA NUMBER 1019835
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 08635 DATE 5/22/64

MASTER

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327.
2. IDENTIFY PER ND 1002019.
3. APPLY PER MIL-P-19834

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER ECO 109024 TDRR 23306 DATE 10-19-65	9-2-65 HEB	10-26-65



A1

QTY REQD	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	6	–		1019307-001	03386900883		PLATE, IDENTIFICATION			
1	5	–		1022835-011	02386910117		ADAPTER ASSY			
1	4	–		1001803	03386911068		CORD POWER SUPPLY, ELECTRICAL			
–	3	1		1019307	03386900883		PLATE, IDENTIFICATION			
1	2	1		1019783	02386900162		MOUNT ASSY			
1	1	1		1001674	02386900176		ILLUMINATOR			
011		000								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .063	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386900028

DRAWN L MARGIOTTA DATE 6-5-64
CHECKED 6-5-64
APPROVAL 6-5-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PORTABLE LIGHT
ASSEMBLY

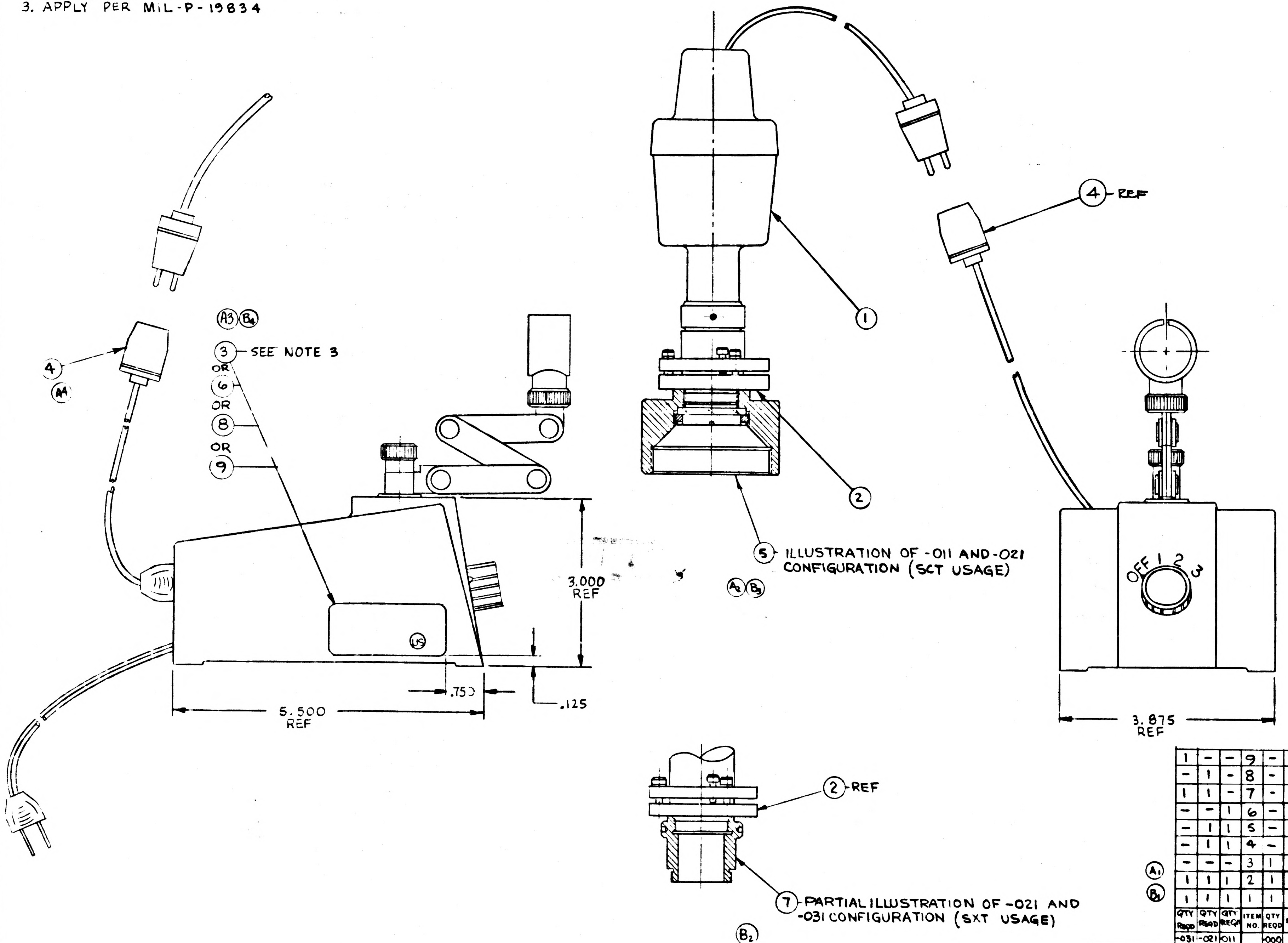
CODE IDENT NO.	SIZE	NASA NUMBER
89944	D	1019837

SCALE 1:1 WEIGHT CALC ACTUAL SHEET 1 OF 1

1019837

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327.
2. IDENTIFY PER ND 1002019.
3. APPLY PER MIL-P-19834

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER ECO 109024 TDRR 23306 DATE 10-19-65	9-21-65 HEB	10-26-65
B4		REVISED PER ECO 117092 TDRR G31979 DATE 11-4-66	11-22-66 JDD	11/22/66



4
A4
A3 B4
3 - SEE NOTE 3
OR
6
OR
8
OR
9
US
3.000 REF
.750
.125
5.500 REF
1
2
5 - ILLUSTRATION OF -011 AND -021 CONFIGURATION (SCT USAGE)
A2 B3
4 - REF
OFF 1 2 3
3.875 REF
2 - REF
7 - PARTIAL ILLUSTRATION OF -021 AND -031 CONFIGURATION (SXT USAGE)
B2

QTY REQD -031	QTY REQD -021	QTY REQD -011	ITEM NO.	QTY REQD -000	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	-	-	9	-		1019307-003	03386900883		PLATE, IDENTIFICATION			
-	1	-	8	-		1019307-002	03386900883		PLATE, IDENTIFICATION			
1	1	-	7	-		1022659	03386912335		ADAPTER, SXT EYEPIECE			
-	-	1	6	-		1019307-001	03386900883		PLATE, IDENTIFICATION			
-	1	1	5	-		1022835-011	02386910117		ADAPTER ASSY			
-	1	1	4	-		1001803	03386911068		CORD POWER SUPPLY, ELECTRICAL			
-	-	-	3	1	A1	1019307	03386900883		PLATE, IDENTIFICATION			
1	1	1	2	1	B1	1019783	02386900162		MOUNT ASSY			
1	1	1	1	1		1001674	02386900176		ILLUMINATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386300028
DRAWN L MARGOTTA DATE 6-5-64
CHECKED
APPROVAL 6-5-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

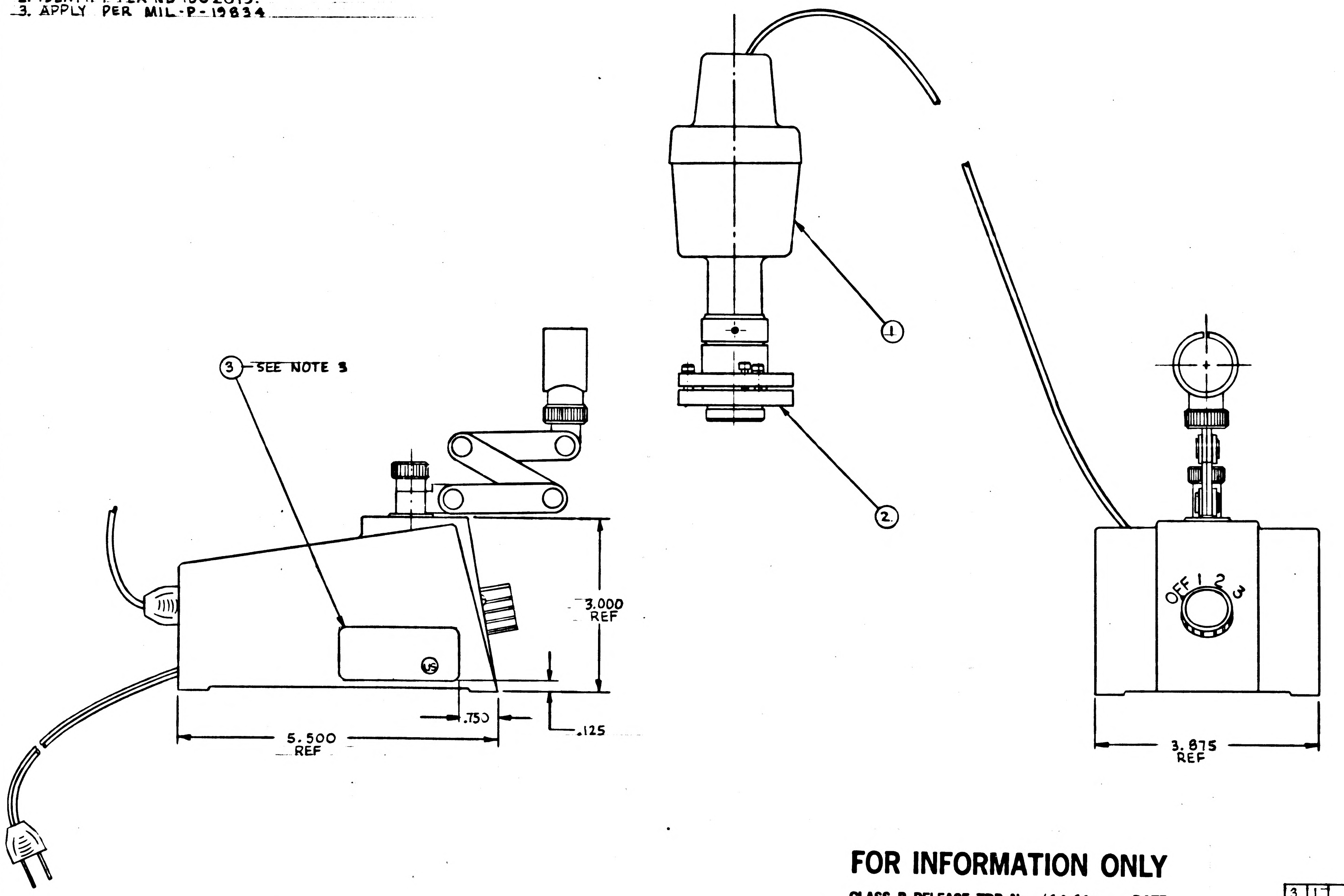
TITLE
PORTABLE LIGHT
ASSEMBLY

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019837
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019837

REVISIONS 10068				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327.
2. IDENTIFY PER ND 1002019.
3. APPLY PER MIL-P-19834



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 10068 DATE 6-9-64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		1019307	03386900883		PLATE, IDENTIFICATION			
2	1		1019783	02386900162		MOUNT ASSY			
1	1		1001674	02386900176		ILLUMINATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1017400

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.063 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386900028
DRAWN L MARGIOTTA DATE 6-5-64
CHECKED 6-5-64
APPROVAL 6-5-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

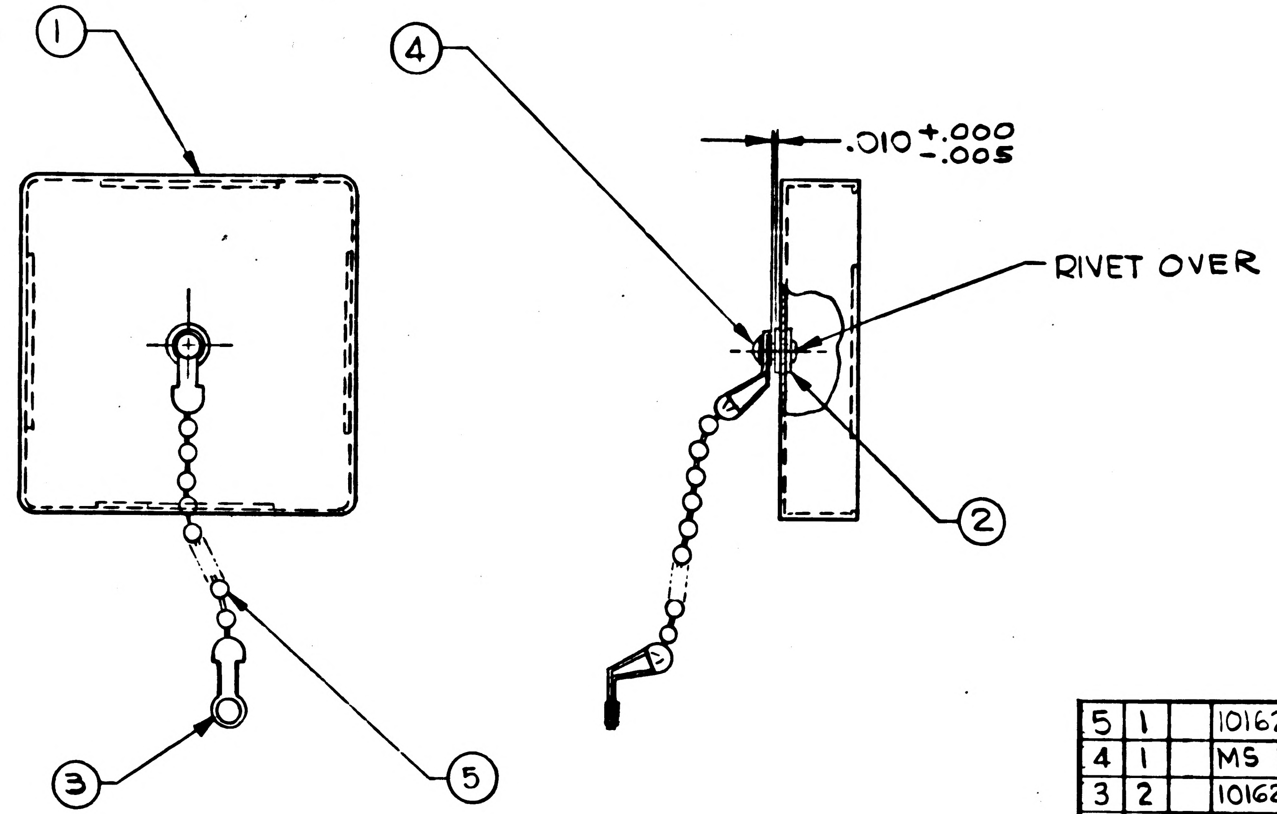
TITLE
PORTABLE LIGHT
ASSEMBLY

CODE IDENT NO.
SIZE D
NASA NUMBER 1019837
SCALE 1 : 1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

1019838

REVISIONS 10479				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG PER MIL-D-70327
2- IDENTIFY PER ND1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		1016293-002			CHAIN-BEAD			
4	1		MS 16535-156	74454012156		RIVET			
3	2		1016294-001			COUPLING-OFFSET, BEAD CHAIN			
2	2		MS15795-303	74468072003		WASHER, FLAT			
1	1		1019323	03386900889		COVER DUST			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 10479 **DATE** 6/23/64

NEXT ASSY	USED ON
1017383	1017383
1017382	1017382

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —//—
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900182

DRAWN A.S. Andolfi DATE 6-9-64
CHECKED F. F. Plesche 6/9/64
APPROVAL W. Meyer 6-9-64
APPROVAL
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019838
SCALE FULL
WEIGHT CALC ACTUAL
SHEET 1 OF 1

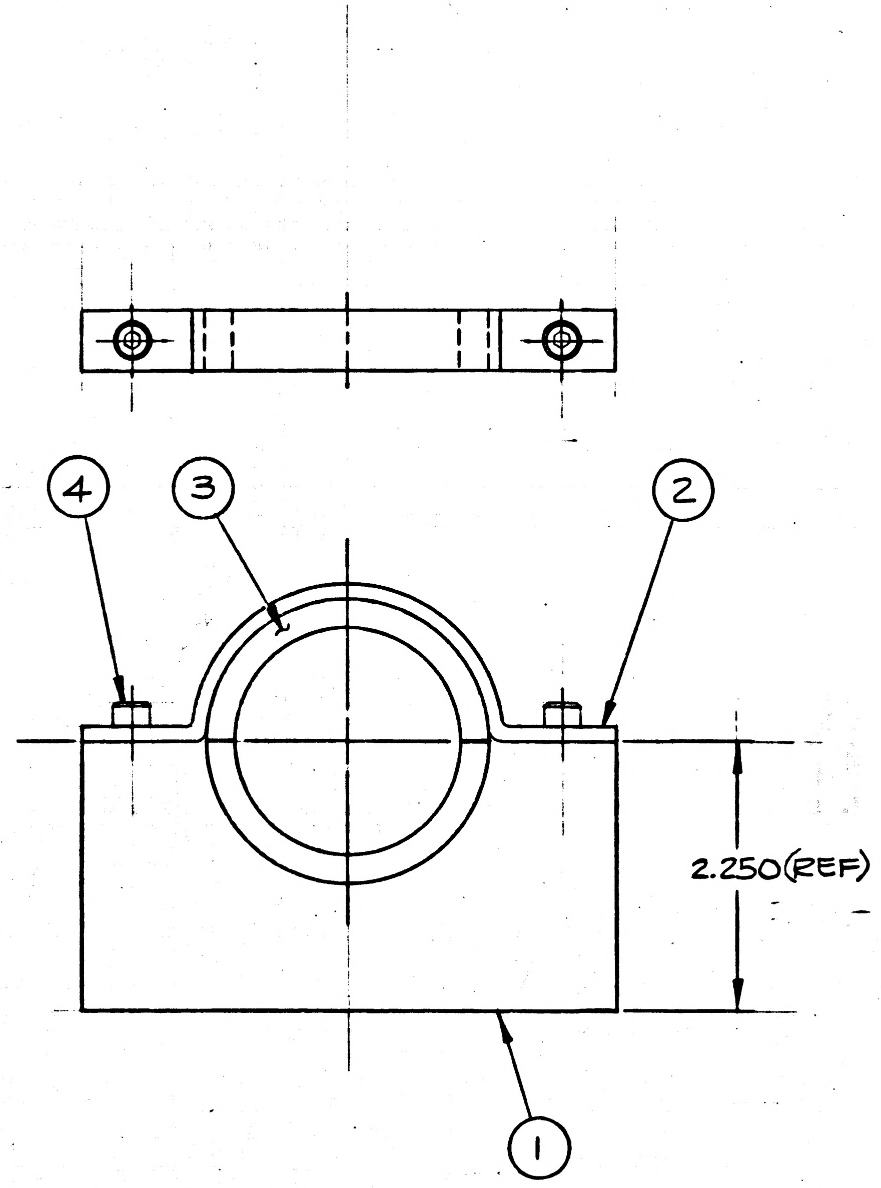
AD-1340

1019838

1019839

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- BOND ITEM 3 TO ITEMS 1 AND 2 USING
3- IDENTIFY PER ND1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		MS16996-9			SCREW, CAP-CYLINDRICAL SOCKET HEAD			
3	2		1019697-2	16020180410-2		STRIP, CUSHION			
2	1		1019696-2	16020180400-2		CLAMP, SUPPORT BLOCK (EYEPIECE)			
1	1		1019695-2	16020180180-2		BLOCK, SUPPORT (EYEPIECE)			

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11273 **DATE** 7/28/64

MASTER

NEXT ASSY	USED ON
1019665	1019720

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020180120

DRAWN N. MAZZA DATE 7-1-64
CHECKED F. J. Plesche 7-2-64
APPROVAL 7-2-64
APPROVAL
NASA APPROVAL A. C. Hodgson 7/28/64
1/28/64
MIT APPROVAL 7/28/64

17020180120

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SUPPORT ASSEMBLY NO.2
(EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 1019839
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1340

1019839

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019840

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

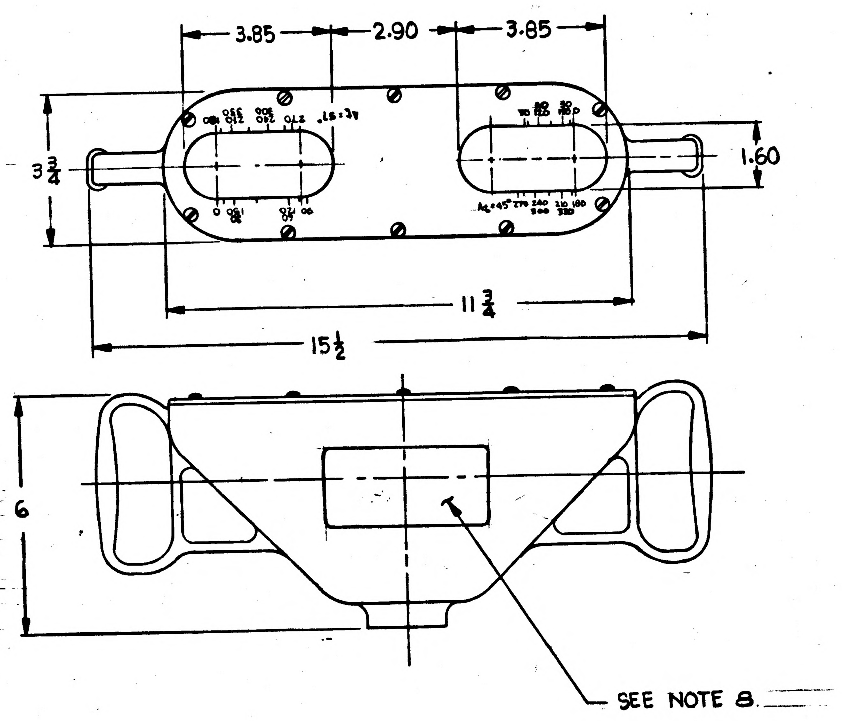
REQUIREMENTS

1- GENERAL
 A- INTERPRET DWG PER MIL-D-70327
 B- SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
 C- THERE SHALL BE NO DOUBLE IMAGING VISIBLE OVER THE ENTIRE USABLE APERTURE
 D- THE GLASS SHALL EXHIBIT NO EVIDENCE OF STRAIN, OR STRIAE.

2-INSPECTION AND ACCEPTANCE
 A-MECHANICAL REQUIREMENTS.
  1- APPROX. WEIGHT = 20 POUNDS.
  2- FINISH: FILL CAST SURFACES AND RUB TO A SMOOTH FINISH, THEN APPLY TWO (2) COATS OF GRAY ENAMEL COLOR NO. 26251 PER FED-STD-595
  3- THE EMERGENT RAY SHALL BE PARALLEL WITHIN 4 SECONDS TO THE ENTRANT RAY

  4- USEFULL APERTURE 1.6 INCHES
  5- DISTANCE BETWEEN CENTERLINES OF ENTRANT AND EMERGENT BUNDLES 9.0 TO 4.5 INCHES
  6- OVERALL DIMENSIONS: LENGTH 15 1/2 INCHES, WIDTH 3 3/4 INCHES, HEIGHT 6 INCHES
  7- A SUITABLE HARD WOOD STORAGE CONTAINER SHALL BE SUPPLIED FOR EACH PRISM ASSY.

  8- APPLY IDENTIFICATION PLATE NO. 1019171 (AT KIC) USING CEMENT EC826 PER MIL-A-5092
  9- THERE SHALL BE SUFFICIENT INSULATION OF THE PRISM TO INSURE NO RESOLUTION OR ALIGNMENT DEGRADATION BY HANDLING DURING TEST UTILIZATION DUE TO THERMAL & MECHANICAL STRESSES
  10- THE ENTRANT SURFACE OF THE PRISM SHALL HAVE A NON-REFLECTIVE COATING
  11- TRANSMISSION AT WAVELENGTH 5600 Å SHALL NOT BE ATTENUATED IN INTENSITY DURING ONE PASSAGE BY AN AMOUNT GREATER THAN 30%
  12- TEST ASSEMBLY AT 60°F ± 5°F, ROOM TEMPERATURE ± 5°F AND 100°F ± 5°F.
  13- GLASS SHALL BE BOROSILICATE CROWN TYPE 2 (BSC-2)
  14- HOLDING FIXTURE MATERIAL SHALL BE ALUMINUM PER FED. CL. QQ-A-371
  15- INSULATION (POTTING) MATERIAL SHALL BE A RIGID POLYURETHANE FOAM



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11999 DATE 8/25/64

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± 1/16, DECIMALS ± .010, ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN A.S. Andolfi DATE 6-19-64
CHECKED 6-29-64
APPROVAL 6-25-64
APPROVAL E.A. Olsen 8/25/64
NASA APPROVAL G.C. [illegible]
MIT APPROVAL [illegible] 8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RETROREFLECTION PRISM ASSY SPECIFICATION CONTROL DWG

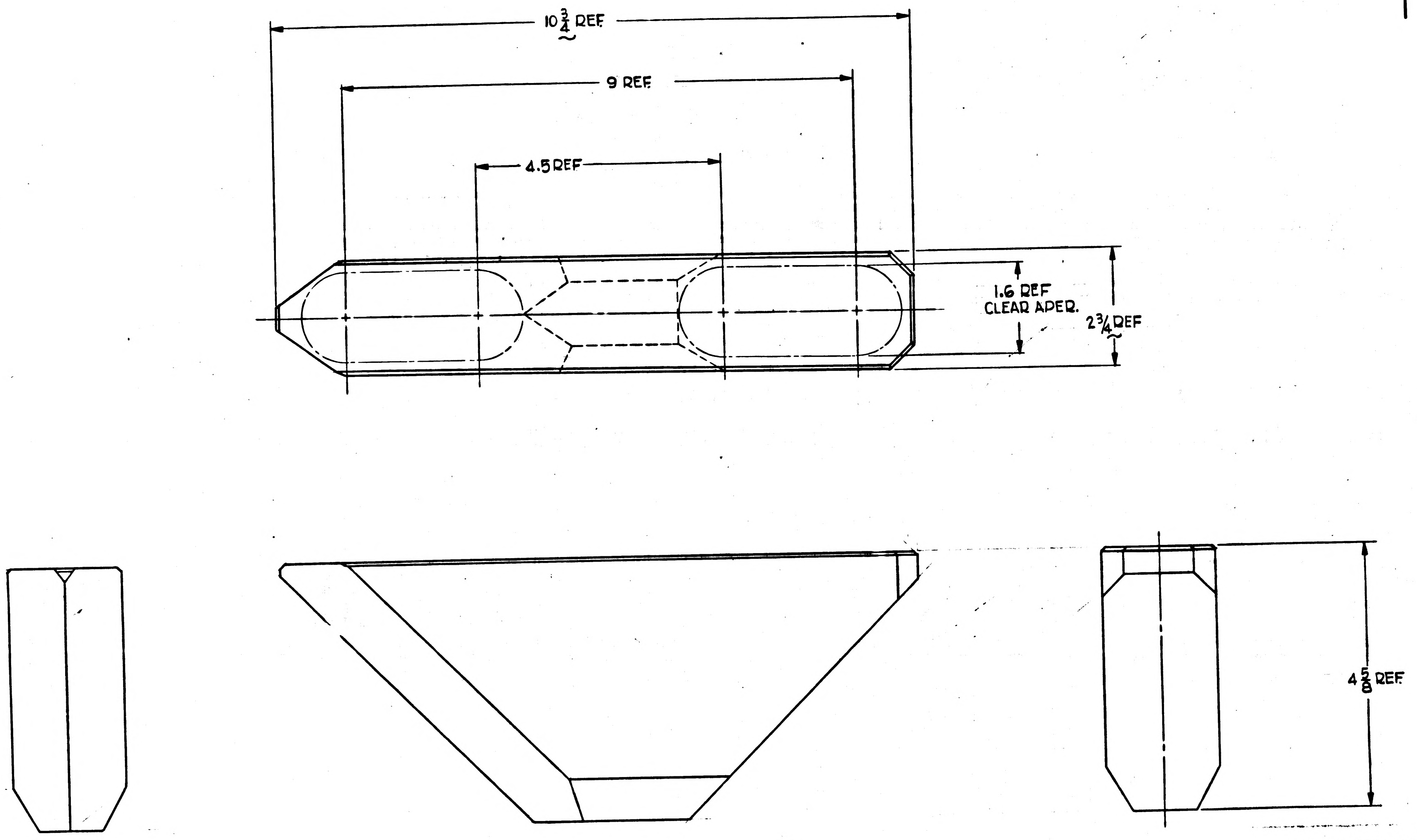
CODE IDENT NO.
SIZE D
NASA NUMBER 1019840
SCALE 1:5
WEIGHT CALC ACTUAL
SHEET 1 OF 2

E-100

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

1019840

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11999 DATE 8/25/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/16	±.010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN

DRAWN A.S. Andolfi DATE 6-22-64
CHECKED 6-29-64
APPROVAL 6-26-64
APPROVAL E.A. Olin 23 Jul 64
NASA APPROVAL 8/25/64
MIT APPROVAL 8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO. SIZE D NASA NUMBER 1019840

SCALE 1:1 WEIGHT CALC ACTUAL SHEET 2 OF 2

MASTER

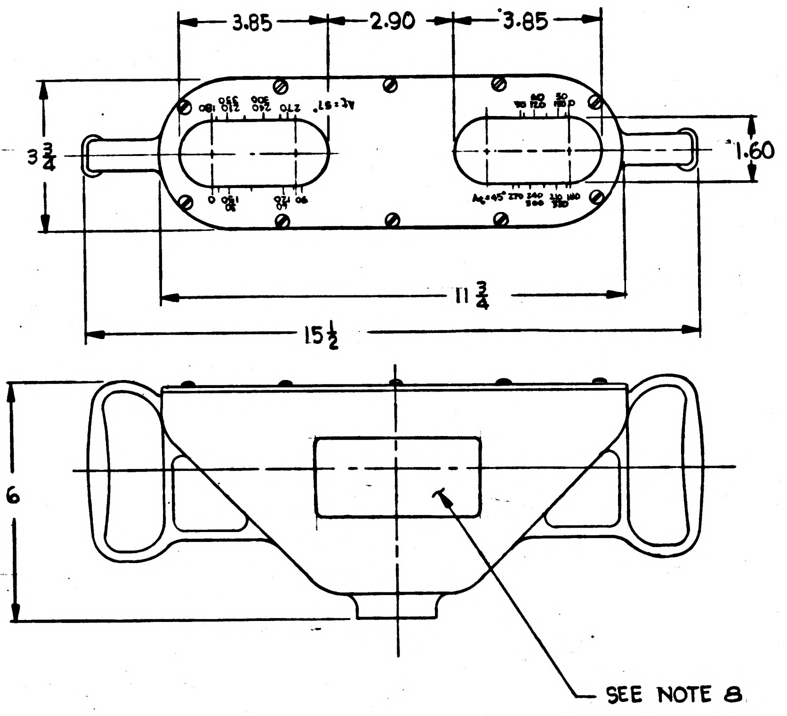
1019840 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED AND REDRAWN TDRR 11999 DATE 8-25-64	8-26-64 ASA	10/6

REQUIREMENTS

1-GENERAL
- A-INTERPRET DWG PER MIL-D-70327
- B-SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
- C-THERE SHALL BE NO DOUBLE IMAGING VISIBLE OVER THE ENTIRE USABLE APERTURE
- D-THE GLASS SHALL EXHIBIT NO EVIDENCE OF STRAIN OR STRIAE.

2-INSPECTION AND ACCEPTANCE
- A-MECHANICAL REQUIREMENTS
  - 1-APPROX. WEIGHT = 20 POUNDS.
  - 2-FINISH: FILL CAST SURFACES AND RUB TO A SMOOTH FINISH, THEN APPLY TWO (2) COATS OF GRAY ENAMEL COLOR NO. 26251 PER FED-STD-595
  - 3-THE EMERGENT RAY SHALL BE PARALLEL WITHIN 4 SECONDS TO THE ENTRANT RAY.
  - 4-USEFULL APERTURE 1.6 INCHES
  - 5-DISTANCE BETWEEN CENTERLINES OF ENTRANT AND EMERGENT BUNDLES 9.0 TO 4.5 INCHES
  - 6-OVERALL DIMENSIONS: LENGTH 15½ INCHES, WIDTH 3 3/4 INCHES, HEIGHT 6 INCHES
  - 7-A SUITABLE HARD WOOD STORAGE CONTAINER SHALL BE SUPPLIED FOR EACH PRISM ASSY.
  - (A2) 8-APPLY IDENTIFICATION PLATE NO. 1019360 (AT KIC) USING CEMENT EC826 PER MIL-A-5092
  - 9-THERE SHALL BE SUFFICIENT INSULATION OF THE PRISM TO INSURE NO RESOLUTION OR ALIGNMENT DEGRADATION BY HANDLING DURING TEST UTILIZATION DUE TO THERMAL & MECHANICAL STRESSES
  - 10-THE ENTRANT SURFACE OF THE PRISM SHALL HAVE A NON-REFLECTIVE COATING
  - 11-TRANSMISSION AT WAVELENGTH 5600 Å SHALL NOT BE ATTENUATED IN INTENSITY DURING ONE PASSAGE BY AN AMOUNT GREATER THAN 30%
  - 12-TEST ASSEMBLY AT 60°F ± 5°F, ROOM TEMPERATURE ± 5°F AND 100°F ± 5°F.
  - 13-GLASS SHALL BE BOROSILICATE CROWN TYPE 2 (BSC-2)
  - 14-HOLDING FIXTURE MATERIAL SHALL BE ALUMINUM PER FED. CL. QQ-A-371
  - 15-INSULATION (POTTING) MATERIAL SHALL BE A RIGID POLYURETHANE FOAM



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 09500 DATE 5/28/68

(A1)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/16	± .010	± ~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188
DRAWN A.S. Andolfi DATE 6-19-64
CHECKED 6-29-64
APPROVAL 6-29-64
APPROVAL E A Olsen 8/25/64
NASA APPROVAL G.C. 8/25/64
MIT APPROVAL 8/26/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

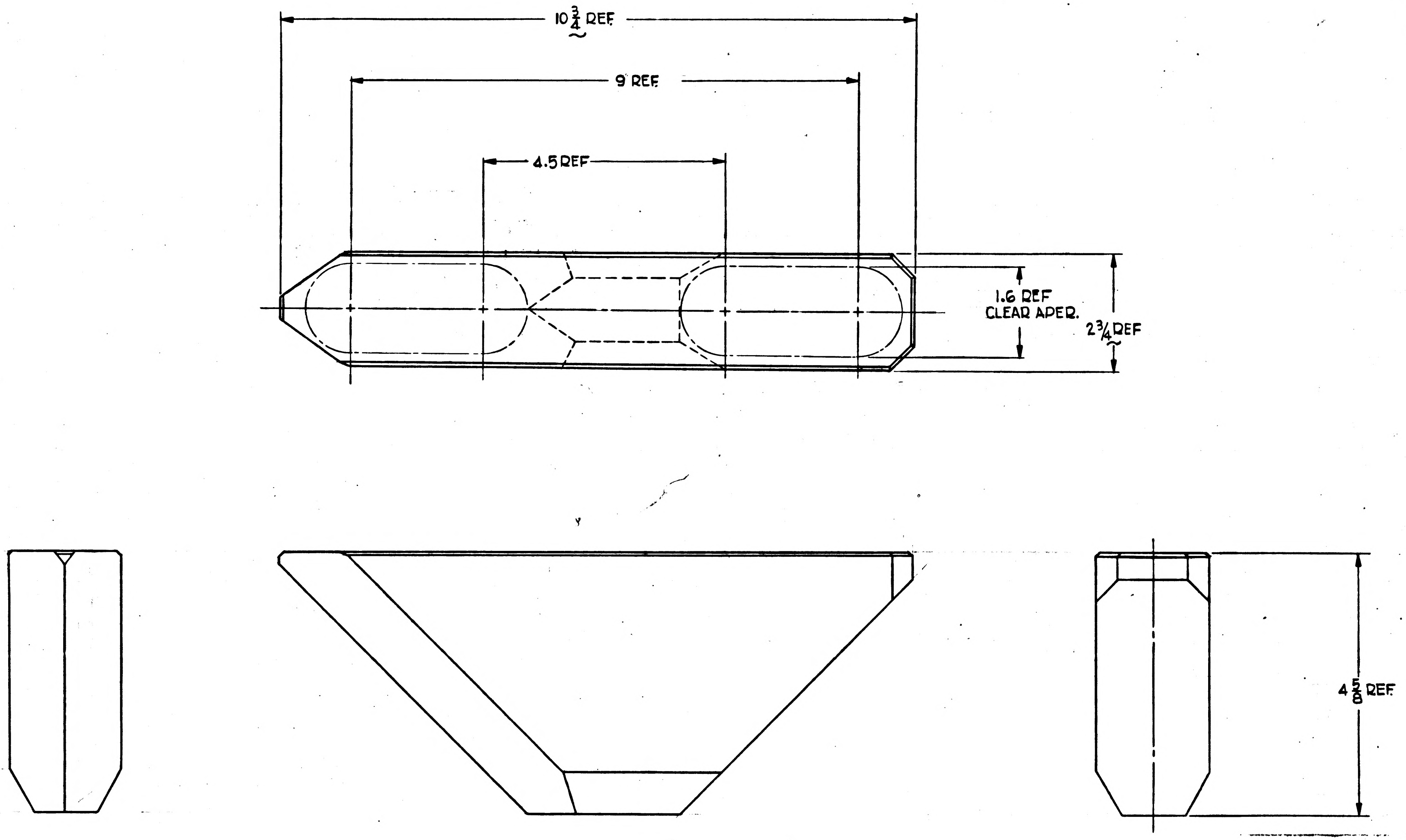
TITLE
RETROREFLECTION PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO.
SIZE D
NASA NUMBER 1019840
SCALE 1:5
WEIGHT CALC ACTUAL
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 1019840

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A3		SEE SHEET 1 OF 2	7-3-64 ASA	



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 095007 **DATE** 5/27/64

A3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
TOL ON	FRACTIONS ± 1/16 · DECIMALS ±.010 · ANGLES ± ~
DO NOT SCALE THIS DRAWING	
MATERIAL	~
CONTRACT	
NEXT ASSY · USED ON	APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188

DRAWN	A.S. Andolfi	DATE 6-22-64
CHECKED		6-29-64
APPROVAL		6-26-64
APPROVAL		25 Jul 64
NASA APPROVAL	R. C. Mot	8/25/64
MIT APPROVAL		8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTION PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO.	SIZE	NASA NUMBER
	D	1019840
SCALE 1:1	WEIGHT CALC ACTUAL	SHEET 2 OF 2

MASTER

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REQUIREMENTS

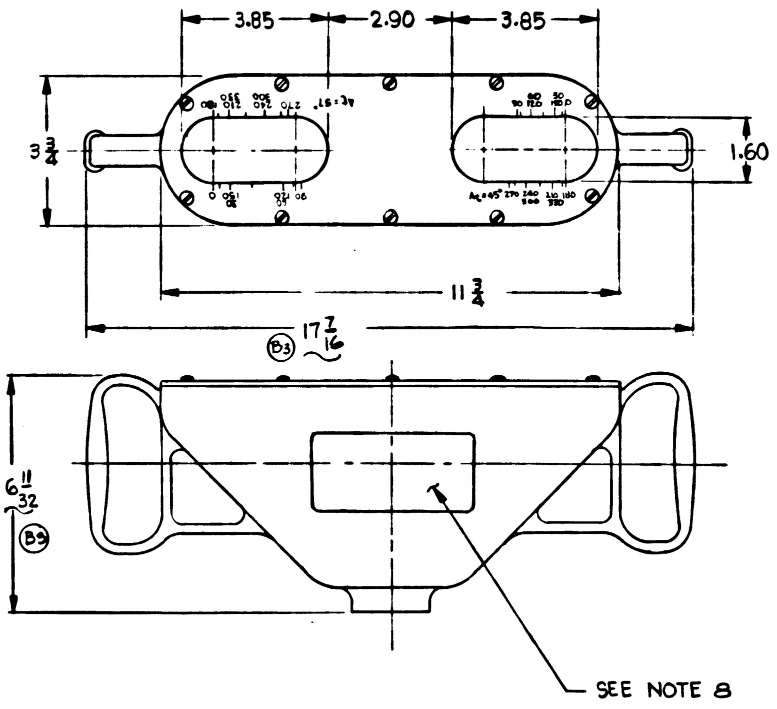
1- GENERAL
- A- INTERPRET DWG PER MIL-D-70327
- B- SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
- C- THERE SHALL BE NO DOUBLE IMAGING VISIBLE OVER THE ENTIRE USABLE APERTURE
- D- THE GLASS SHALL EXHIBIT NO EVIDENCE OF STRAIN, OR STRIAE.

2- INSPECTION AND ACCEPTANCE
- A- MECHANICAL REQUIREMENTS
  - 1- APPROX. WEIGHT = 20 POUNDS.
  - 2- FINISH: FILL CAST SURFACES AND RUB TO A SMOOTH FINISH, THEN APPLY TWO (2) COATS OF GRAY ENAMEL COLOR NO. 26251 PER FED-STD-595
  - 3- THE EMERGENT RAY SHALL BE PARALLEL WITHIN 4 SECONDS TO THE ENTRANT RAY
  - 4- USEFULL APERTURE 1.6 INCHES
  - 5- DISTANCE BETWEEN CENTERLINES OF ENTRANT AND EMERGENT BUNDLES 9.0 TO 4.5 INCHES
  - 6- OVERALL DIMENSIONS: (B3) LENGTH 17 7/16 INCHES, WIDTH 3 3/4 INCHES, HEIGHT 6 11/32 INCHES
  - 7- A SUITABLE HARD WOOD STORAGE CONTAINER SHALL BE SUPPLIED FOR EACH PRISM ASSY.
  - (A2) 8- APPLY IDENTIFICATION PLATE NO. 1019360 (AT KIC) USING CEMENT EC826 PER MIL-A-5092
  - 9- THERE SHALL BE SUFFICIENT INSULATION OF THE PRISM TO INSURE NO RESOLUTION OR ALIGNMENT DEGRADATION BY HANDLING DURING TEST UTILIZATION DUE TO THERMAL & MECHANICAL STRESSES
  - 10- THE ENTRANT SURFACE OF THE PRISM SHALL HAVE A NON-REFLECTIVE COATING
  - 11- TRANSMISSION AT WAVELENGTH 5600 Å SHALL NOT BE ATTENUATED IN INTENSITY DURING ONE PASSAGE BY AN AMOUNT GREATER THAN 55% (B4)
  - 12- TEST ASSEMBLY AT 60°F ± 5°F, ROOM TEMPERATURE ± 5°F AND 100°F ± 5°F.
  - 13- GLASS SHALL BE BOROSILICATE CROWN TYPE 2 (BSC-2)
  - 14- HOLDING FIXTURE MATERIAL SHALL BE ALUMINUM PER FED CL. QQ-A-371
  - 15- INSULATION (POTTING) MATERIAL SHALL BE A RIGID POLYURETHANE FOAM

3- REQUIREMENT: FOR CERTIFICATION EQUIPMENT (B1) USE PART NO. 1019849, RETROREFLECTING PRISM CERTIFICATION FIXTURE.

4- UNIT SHALL BE PROVIDED WITH A PROTECTIVE COVER (C1) TO FIT OVER BOTH APERTURES.

5- FOR STORAGE PLACE UNIT IN CONTAINER PART NO. 1019852.



(B5)

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

1019840 C

REVISIONS TDRR 09500

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED AND REDRAWN TDRR 11999 DATE 8-25-64	ASA	
B5		REVISED PER ECP 10900 TDRR 15931 DATE: 2-1-65	T.L. 2-1-65	
C1	B8	REVISED PER ECP 109602 TDRR 17126 DATE: 3-2-65	3-11-65 ALR	B.H. 3-6-65

(A1) (B2)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± 1/16; DECIMALS ± .010; ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188
DRAWN A.S. Andolfi DATE 6-19-64
CHECKED 6-29-64
APPROVAL 6-30-64
APPROVAL E.A. Olsen 8/25/64
NASA APPROVAL
MIT APPROVAL 8/25/64

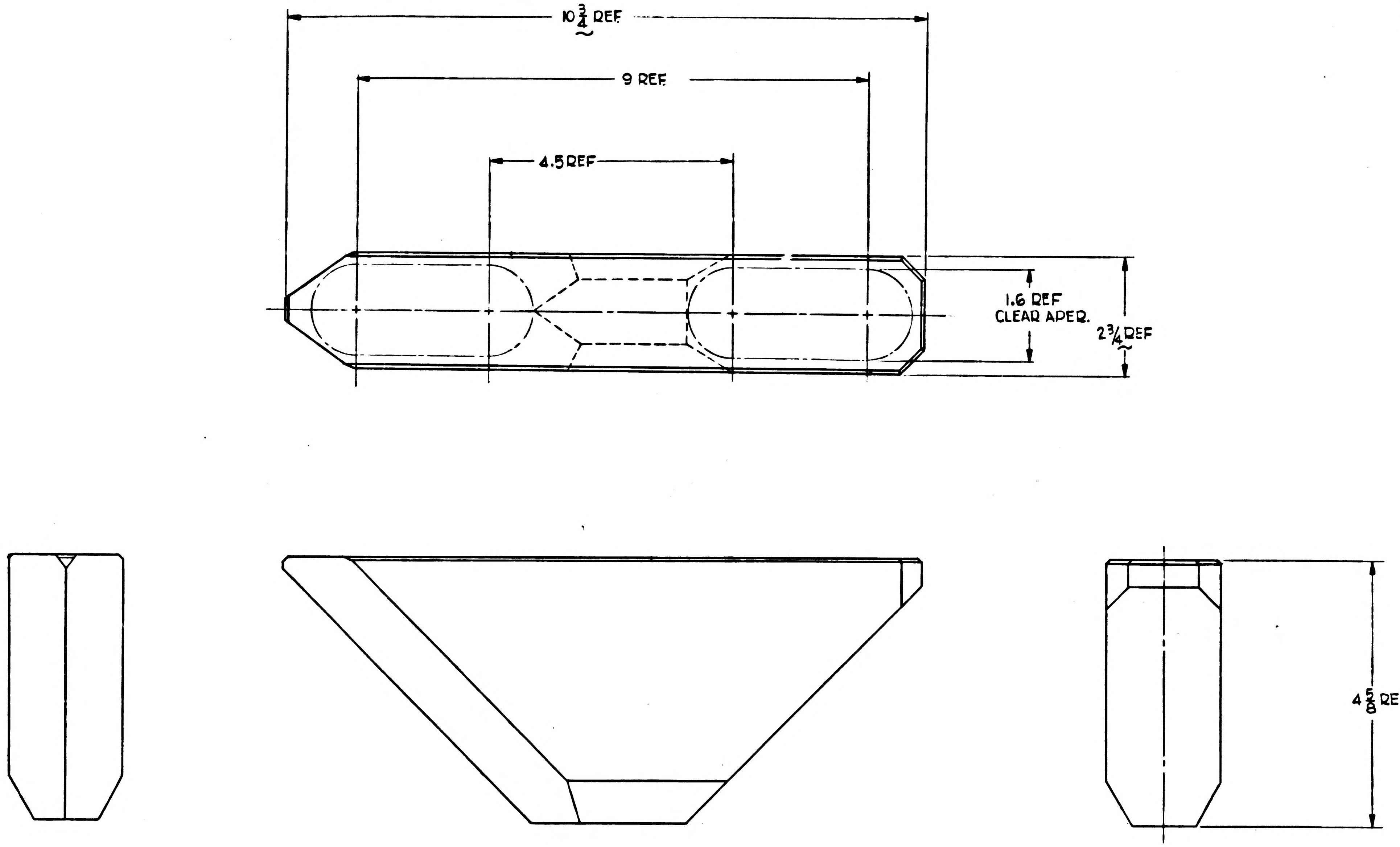
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO. | SIZE D | NASA NUMBER 1019840
SCALE 1:2 | WEIGHT CALC ACTUAL | SHEET 1 OF 2

1019840 C

REVISIONS DRC 09500 5-27-64				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A3		SEE SHEET 1 OF 2	4-3-64 ASA	
B5		SEE SHEET 1 OF 2	2-2-6	8-2-68
C1		SEE SHEET 1 OF 2	3-11-65 ALE	B.W. 3-6-65



B5

B2

A3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/16	±.010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188

DRAWN A.S. Andolfi DATE 6-22-64
CHECKED 6-29-64
APPROVAL 6-26-64
APPROVAL 25 Jun 64
NASA APPROVAL 8/25/64
MIT APPROVAL 8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO.
SIZE D
NASA NUMBER 1019840
SCALE 1:1
WEIGHT
CALC ACTUAL
SHEET 2 OF 2

1019840 C

D 1019840

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A8		REVISED AND REDRAWN TDRR 11999 DATE 8-25-64	8-26-64 ASA	10/6
B5		REVISED PER ECP 109001 TDRR 15931 DATE: 2-1-65	T.L. 2-1-65	
C1	B8	REVISED PER ECP 109602 TDRR 17126 DATE: 3-2-65	3-65 ALR	
D4		REVISED PER ECP NO. 1905 TDRR 19994 DATE 6/3/65	6-12-65	

REQUIREMENTS

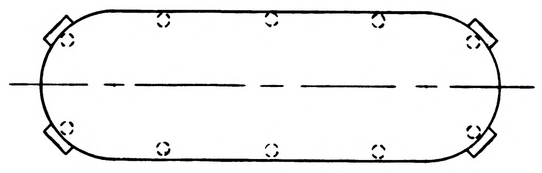
1- GENERAL
- A- INTERPRET DWG PER MIL-D-70327
- B- SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
- C- THERE SHALL BE NO DOUBLE IMAGING VISIBLE OVER THE ENTIRE USABLE APERTURE
- D- THE GLASS SHALL EXHIBIT NO EVIDENCE OF STRAIN OR STRIAE.

2- INSPECTION AND ACCEPTANCE
- A- MECHANICAL REQUIREMENTS
  - 1- APPROX. WEIGHT = 20 POUNDS.
  - 2- FINISH: FILL CAST SURFACES AND RUB TO A SMOOTH FINISH, THEN APPLY TWO (2) COATS OF GRAY ENAMEL COLOR NO. 26251 PER FED-STD-595
  - 3- THE EMERGENT RAY SHALL BE PARALLEL WITHIN 4 SECONDS TO THE ENTRANT RAY
  - 4- USEFULL APERTURE 1.6 INCHES
  - 5- DISTANCE BETWEEN CENTERLINES OF ENTRANT AND EMERGENT BUNDLES 9.0 TO 4.5 INCHES
  - 6- OVERALL DIMENSIONS: (B3) LENGTH 17 7/16 INCHES, WIDTH 3 3/4 INCHES, HEIGHT 6 11/32 INCHES
  - 7- A SUITABLE HARD WOOD STORAGE CONTAINER SHALL BE SUPPLIED FOR EACH PRISM ASSY.
  - (A2) 8- APPLY IDENTIFICATION PLATE NO. 1019360 (AT KIC) USING CEMENT EC826 PER MIL-A-5092
  - 9- THERE SHALL BE SUFFICIENT INSULATION OF THE PRISM TO INSURE NO RESOLUTION OR ALIGNMENT DEGRADATION BY HANDLING DURING TEST UTILIZATION DUE TO THERMAL & MECHANICAL STRESSES
  - 10- THE ENTRANT SURFACE OF THE PRISM SHALL HAVE A NON-REFLECTIVE COATING
  - 11- TRANSMISSION AT WAVELENGTH 5600 Å SHALL NOT BE ATTENUATED IN INTENSITY DURING ONE PASSAGE BY AN AMOUNT GREATER THAN 55% (B4)
  - 12- TEST ASSEMBLY AT 60°F ± 5°F, ROOM TEMPERATURE ± 5°F AND 100°F ± 5°F.
  - 13- GLASS SHALL BE BOROSILICATE CROWN TYPE 2 (BSC-2)
  - 14- HOLDING FIXTURE MATERIAL SHALL BE ALUMINUM PER FED. CL. QQ-A-371
  - 15- INSULATION (POTTING) MATERIAL SHALL BE A RIGID POLYURETHANE FOAM

3- REQUIREMENT: FOR CERTIFICATION EQUIPMENT (B1) USE PART NO. 1019849, RETROREFLECTING PRISM CERTIFICATION FIXTURE.

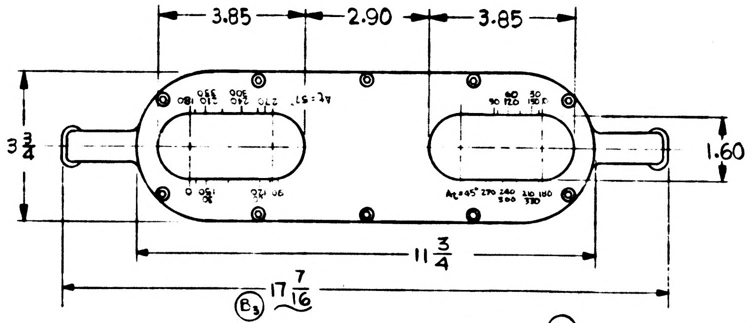
4- UNIT SHALL BE PROVIDED WITH A PROTECTIVE COVER (C1) TO FIT OVER BOTH APERTURES: MATERIAL: CLEAR PLASTIC PER MIL-P-5425, FINISH A (D1)

5- FOR STORAGE PLACE UNIT IN CONTAINER PART NO. 1019852.

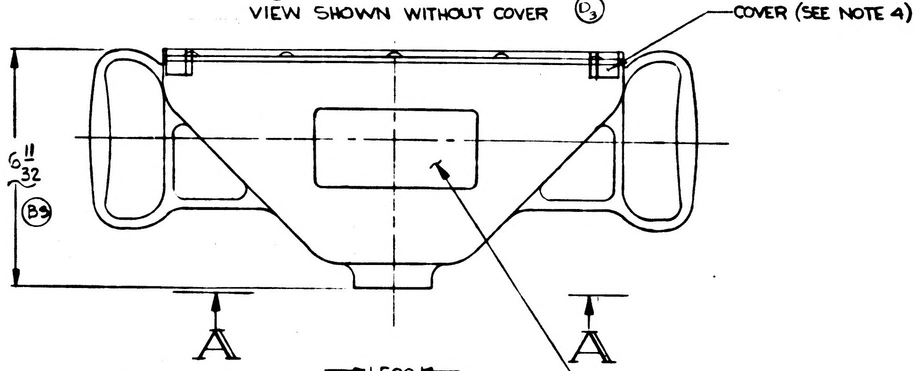


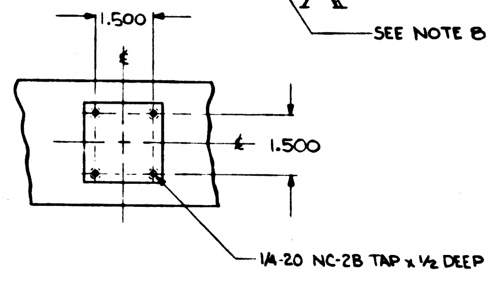
VIEW OF COVER

(D2)



VIEW SHOWN WITHOUT COVER (D3)





PARTIAL VIEW-A-A

(D4)

(B6)

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

(A1) (B2)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/16	± .010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188

DRAWN A.S. Angolfo DATE 6-19-64
CHECKED 6-25-64
APPROVAL 6-26-64
APPROVAL 8/25/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

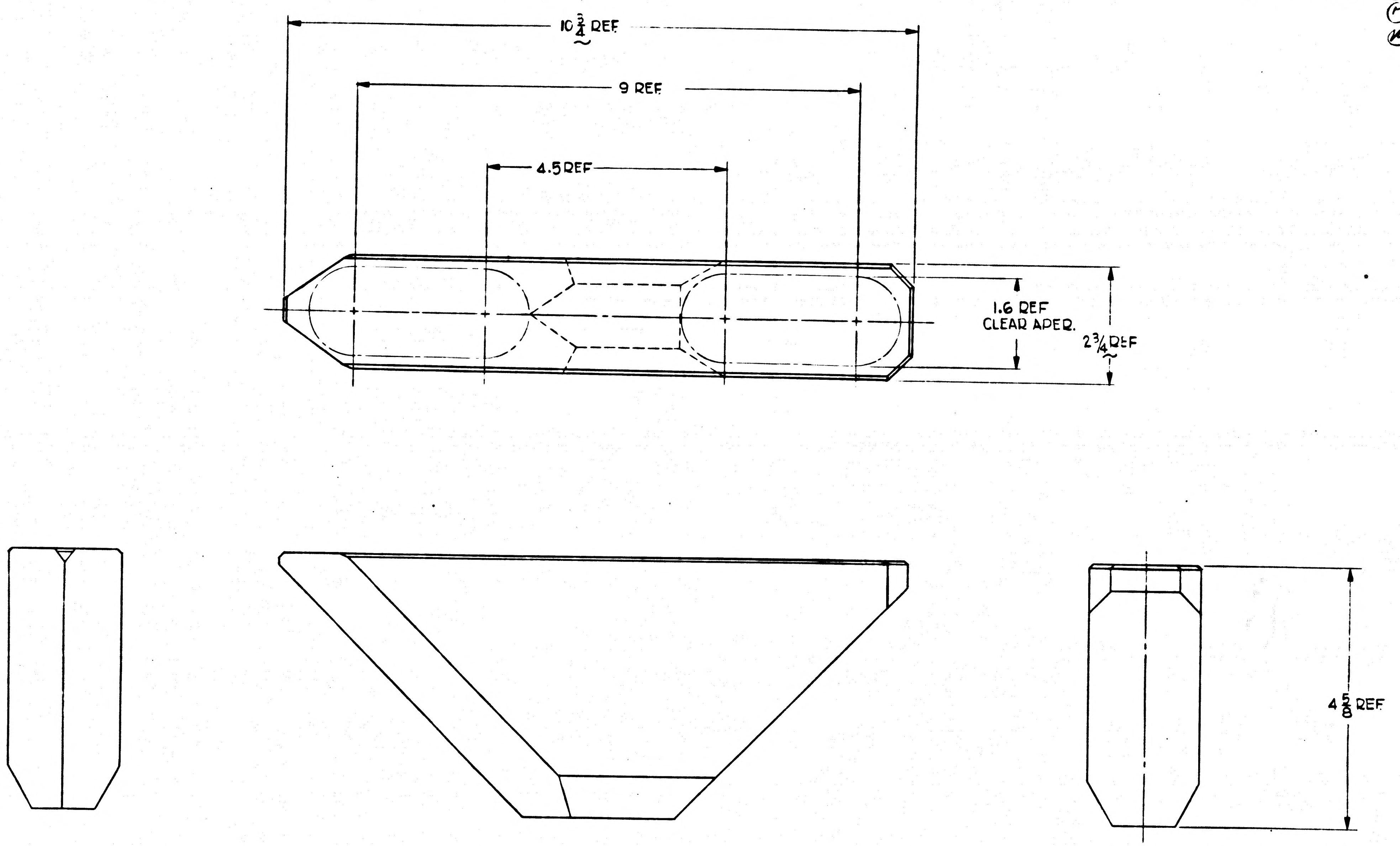
CODE IDENT NO. | SIZE D | NASA NUMBER 1019840

SCALE 1:2 | WEIGHT CALC ACTUAL | SHEET 1 OF 2

D 1019840

D 1019840

REVISIONS DRC 09.00 5-27-64				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A3		SEE SHEET 1 OF 2	9-3-64 ASA	9-62
B5		SEE SHEET 1 OF 2	2-2-65	8-2-65
C1		SEE SHEET 1 OF 2	3-11-65 ALR	B.W. 3-16-65
D4		SEE SHEET 1 OF 2	6-12-65	6-30



(B5)

(B2) (A3)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/16	±.010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900188

DRAWN A.S. Andolfi DATE 6-22-64
CHECKED 6-29-64
APPROVAL 6-29-64
APPROVAL
NASA APPROVAL 8/25/64
MIT APPROVAL 8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO.
SIZE D
NASA NUMBER 1019840
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019840 D

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

1019840

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS

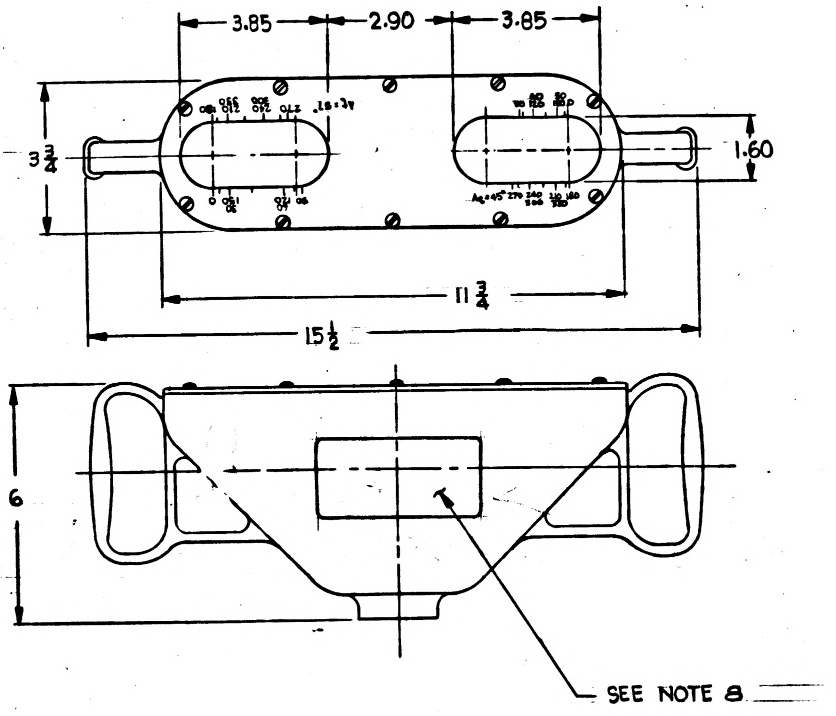
REQUIREMENTS

1-GENERAL
A- INTERPRET DWG PER MIL-D-70327
B-SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND1015404 CLASS 3
C-THERE SHALL BE NO DOUBLE IMAGING VISIBLE OVER THE ENTIRE USABLE APERTURE
D-THE GLASS SHALL EXHIBIT NO EVIDENCE OF STRAIN, OR STRIAE.

2-INSPECTION AND ACCEPTANCE
A-MECHANICAL REQUIREMENTS
1-APPROX. WEIGHT=20 POUNDS.
2-FINISH: FILL CAST SURFACES AND RUB TO A SMOOTH FINISH, THEN APPLY TWO (2) COATS OF GRAY ENAMEL COLOR NO. 26251 PER FED-STD-595
3-THE EMERGENT RAY SHALL BE PARALLEL WITHIN 4 SECONDS TO THE ENTRANT RAY

4-USEFULL APERTURE 1.6 INCHES
5-DISTANCE BETWEEN CENTERLINES OF ENTRANT AND EMERGENT BUNDLES 9.0 TO 4.5 INCHES
6-OVERALL DIMENSIONS:
LENGTH 15½ INCHES, WIDTH 3 3/4 INCHES, HEIGHT 6 INCHES
7-A SUITABLE HARD WOOD STORAGE CONTAINER SHALL BE SUPPLIED FOR EACH PRISM ASSY.

8-APPLY IDENTIFICATION PLATE NO. 1019171 (AT KIC) USING CEMENT EC826 PER MIL-A-5092
9-THERE SHALL BE SUFFICIENT INSULATION OF THE PRISM TO INSURE NO RESOLUTION OR ALIGNMENT DEGRADATION BY HANDLING DURING TEST UTILIZATION DUE TO THERMAL & MECHANICAL STRESSES
10-THE ENTRANT SURFACE OF THE PRISM SHALL HAVE A NON-REFLECTIVE COATING
11-TRANSMISSION AT WAVELENGTH 5600 Å SHALL NOT BE ATTENUATED IN INTENSITY DURING ONE PASSAGE BY AN AMOUNT GREATER THAN 30%
12-TEST ASSEMBLY AT 60°F ± 5°F, ROOM TEMPERATURE ±5°F AND 100°F ± 5°F.
13-GLASS SHALL BE BOROSILICATE CROWN TYPE 2 (BSC-2)
14-HOLDING FIXTURE MATERIAL SHALL BE ALUMINUM PER FED. CL. QQ-A-371
15-INSULATION (POTTING) MATERIAL SHALL BE A RIGID POLYURETHANE FOAM



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11999 DATE 8/25/64

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND1002034 FOR THIS DRAWING

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± 1/16 DECIMALS ±.010 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN A.S. Andolfi DATE 6-19-64
CHECKED 6-29-64
APPROVAL 6-25-64
APPROVAL E.A. Olsen 8/25/64
NASA APPROVAL G.C. 8/25/64
MIT APPROVAL 8/25/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTION PRISM ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO.
SIZE D
NASA NUMBER 1019840
SCALE 1:5
WEIGHT CALC ACTUAL
SHEET 1 OF 2

E-100

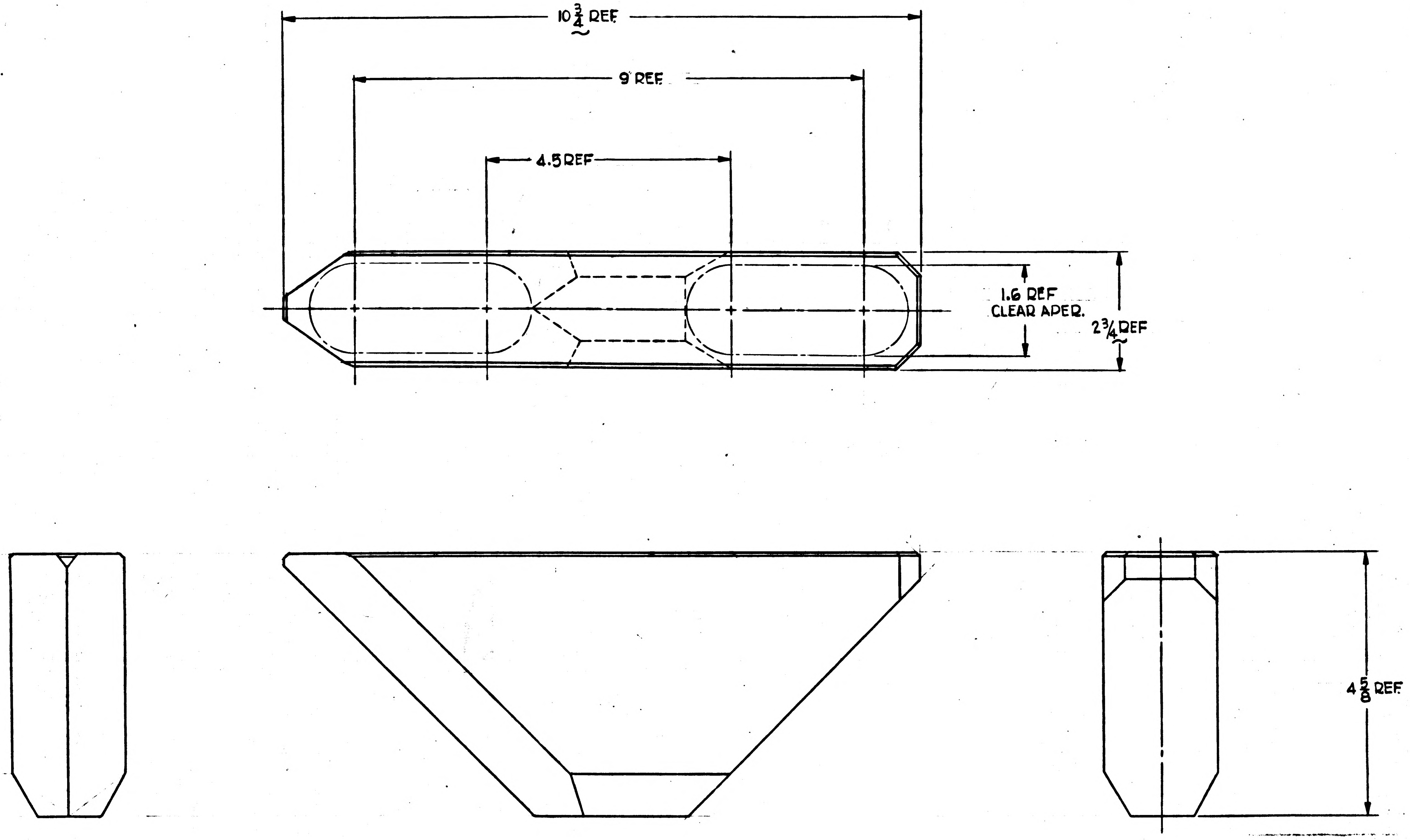
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

INCHES
0 1 2

1019840

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 11999 DATE 8/25/64

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± 1/16 | DECIMALS ±.010 | ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN A.S. Andolfi DATE 6-22-64
CHECKED 6-29-64
APPROVAL 6-26-64
APPROVAL E.A. 25 Jul 64
NASA APPROVAL 8/25/64
MIT APPROVAL 8/25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
ASSY
SPECIFICATION CONTROL DWG

CODE IDENT NO. | SIZE D | NASA NUMBER 1019840
SCALE 1:1 | WEIGHT | CALC ACTUAL | SHEET 2 OF 2

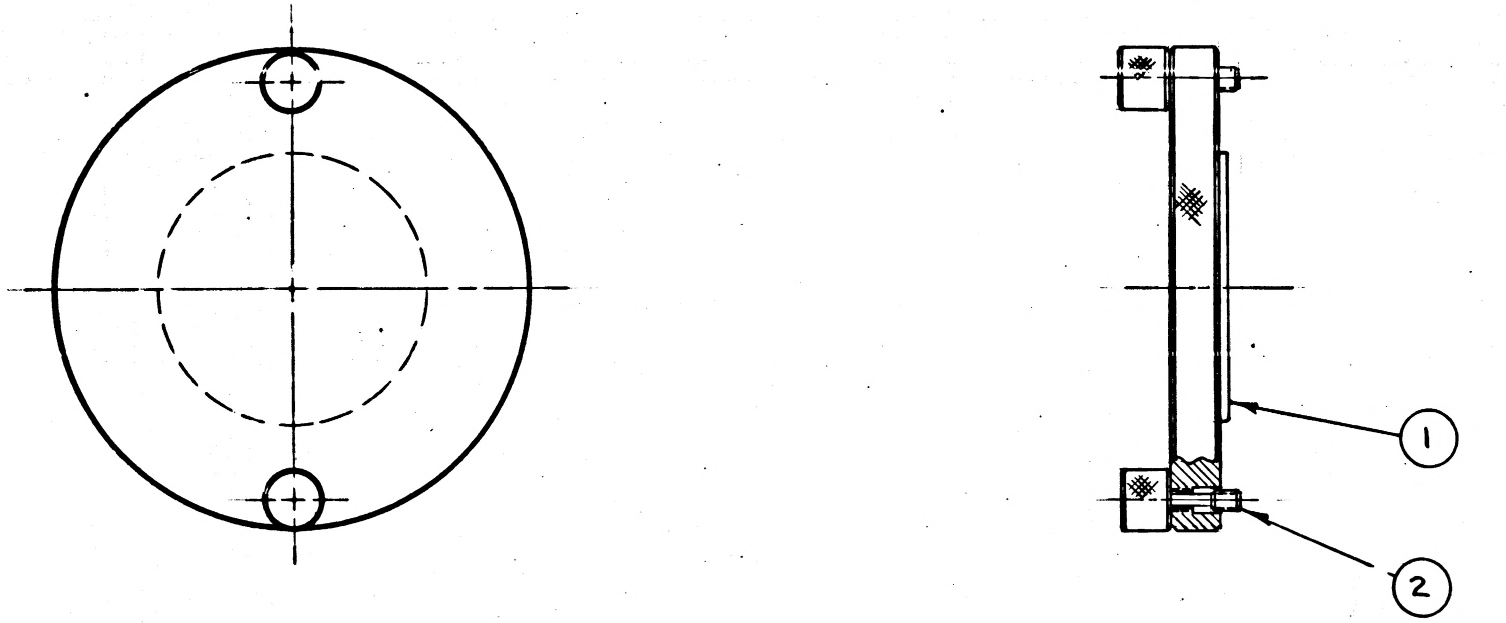
MASTER

1019844

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- IDENTIFY USING NASA DWG. NO., REV LETTER AND MFRS SYMBOL PER ND1002019 (BAGGED OR TAGGED).



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2		1019352	16020180470		SCREW, CAPTIVE			
1	1		1019351	16020180460		COVER, DUST			

LIST OF PARTS AND MATERIALS

MASTER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 12922 **DATE** 9/23/64

NEXT ASSY	USED ON
1019665	1019720
1019699	1019700

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020180160
DRAWN H.E. BOLD DATE 8-14-64
CHECKED N. MAZZA 8-18-64
APPROVAL 8-21-64
APPROVAL
NASA APPROVAL 9/4/64
MIT APPROVAL 23 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER AND SCREW ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019844
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1340

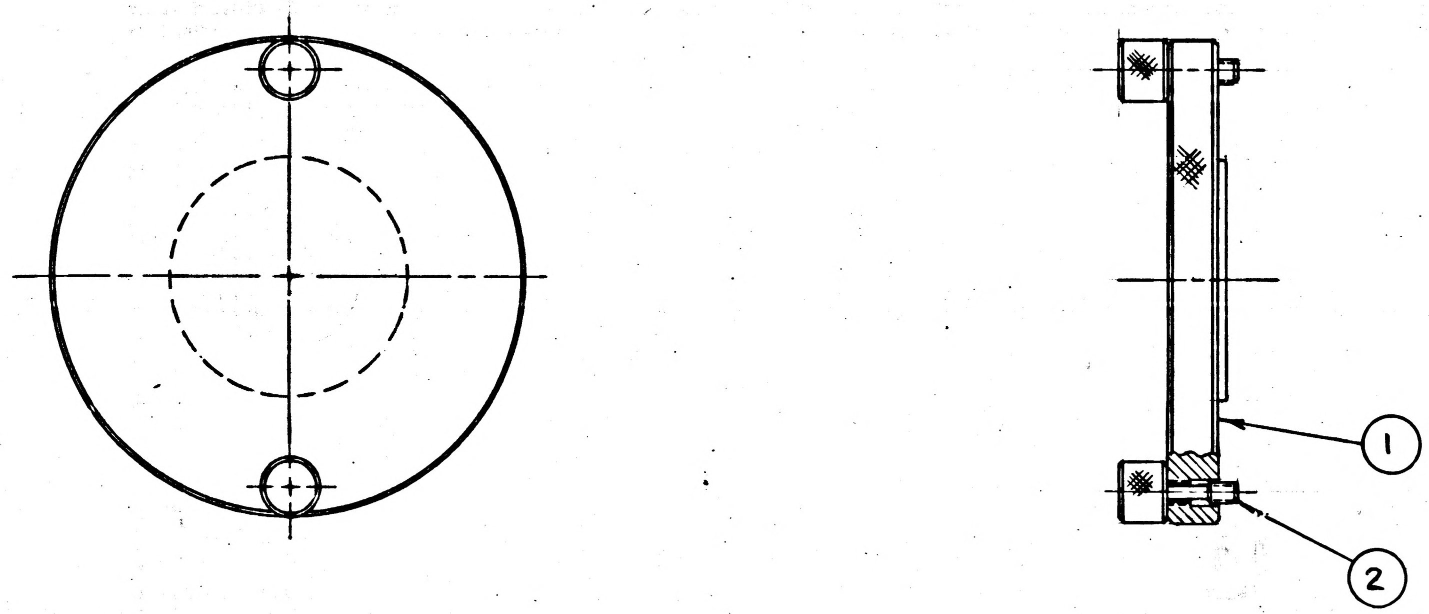
INCHES
0 1 2
PHOTOGRAPHIC SCALE

1019845

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2- IDENTIFY USING NASA DWG NO., REV LETTER AND MFRS SYMBOL PER ND 1002019 (BAGGED OR TAGGED).



MASTER

2	2		1019352	16020180470		SCREW, CAPTIVE			
1	1		1019350	16020180450		COVER, DUST			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 12922 DATE 9/23/64

1019665	1019720
1019699	1019700
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 17020180170

DRAWN H.E.BOLD DATE 8-14-64
CHECKED N MAZZA 8-18-64
APPROVAL 8-21-64
APPROVAL
NASA APPROVAL
9/21/64
MIT APPROVAL 23 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER AND SCREW ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019845

SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

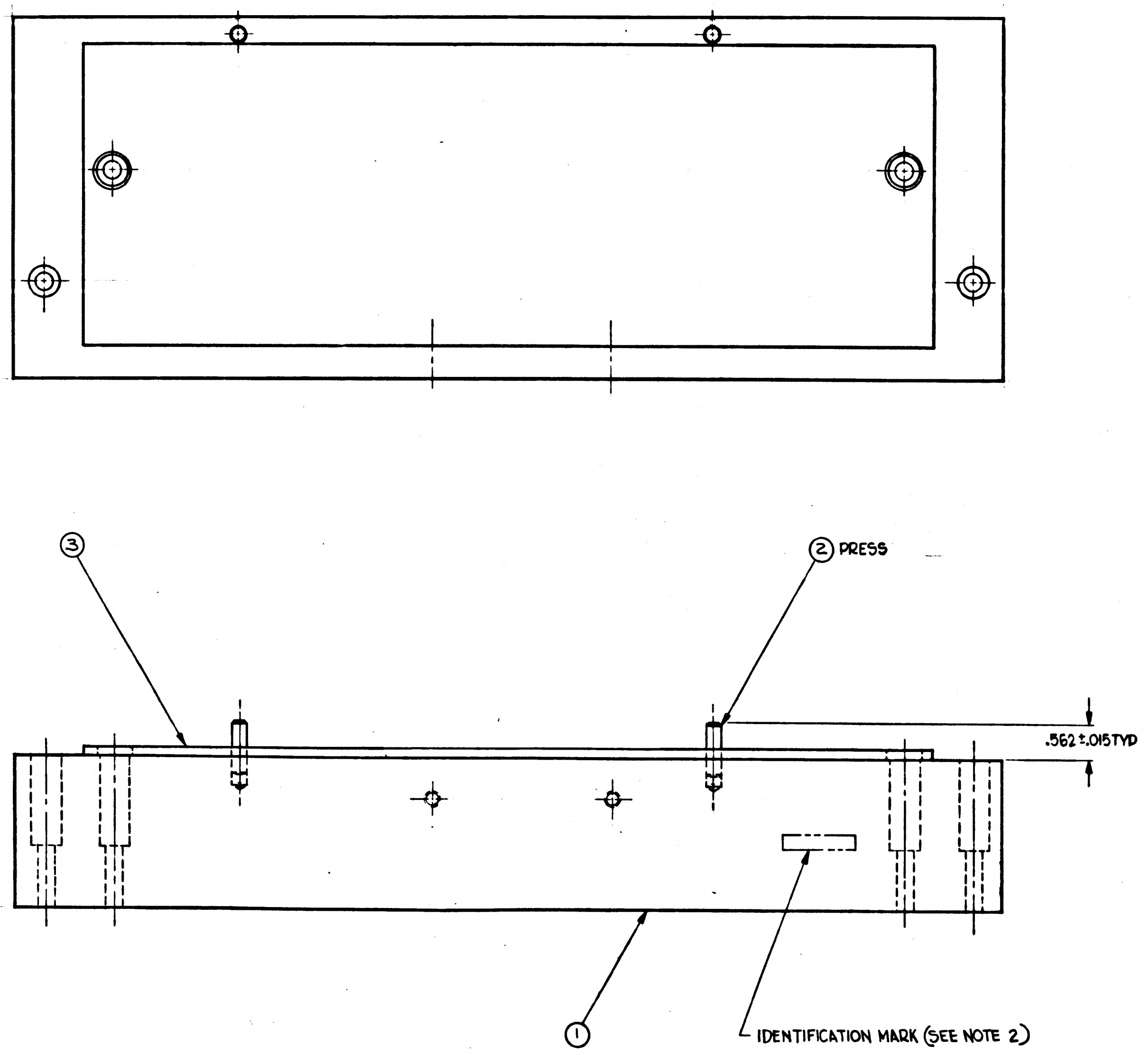
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1019846

REVISIONS TORR 1523 1/5/65				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-IDENTIFY USING NASA DWG NO., REV LETTER AND MANUFACTURERS SYM PER ND1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1	·	1019356	03386900927		PAD			
2	2		1017415-92	73002105136		PIN, DOWEL			
1	1	·	1019358	03386900929		BASE BLOCK			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019849	1019849
1016952	1016952

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900185
DRAWN A.S.Andolfi DATE 8-21-64
CHECKED L. MORGAN 8-31-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
SUPPORT FIXTURE ASSY

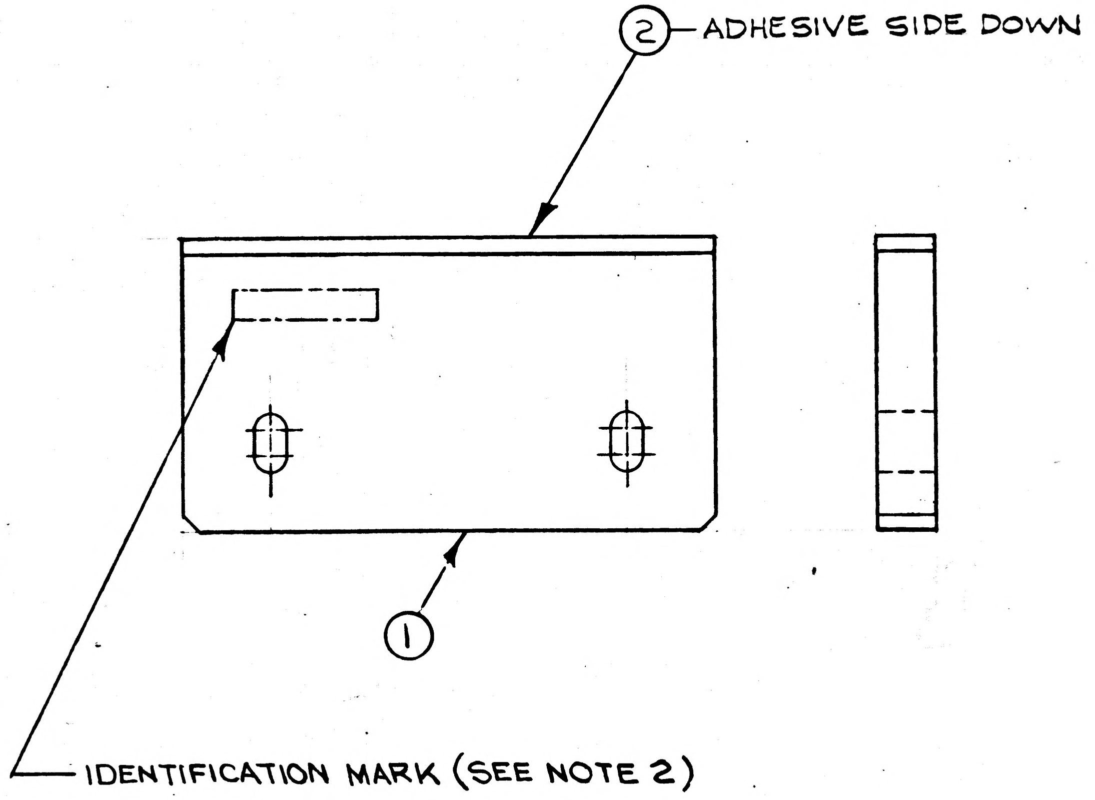
CODE IDENT NO.
SIZE E
NASA NUMBER 1019846
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019847

REVISIONS TDRR 15285 1/5/64

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. - INTERPRET DWG. PER MIL-D-70327
2. - IDENTIFY USING NASA DWG. NO., REV. LETTER AND MANUFACTURES SYM PER ND 1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1	.	1019355	03386900926		PAD			
1	1	.	1019357	03386900928		SUPPORT, PLATE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019849	1019849

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —/—
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900186
DRAWN J. CARDILE DATE 8-26-64
CHECKED L. MORGAN 8-31-64
APPROVAL 9-2-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE AND PAD
ASSY

CODE IDENT NO.
SIZE C
NASA NUMBER 1019847
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

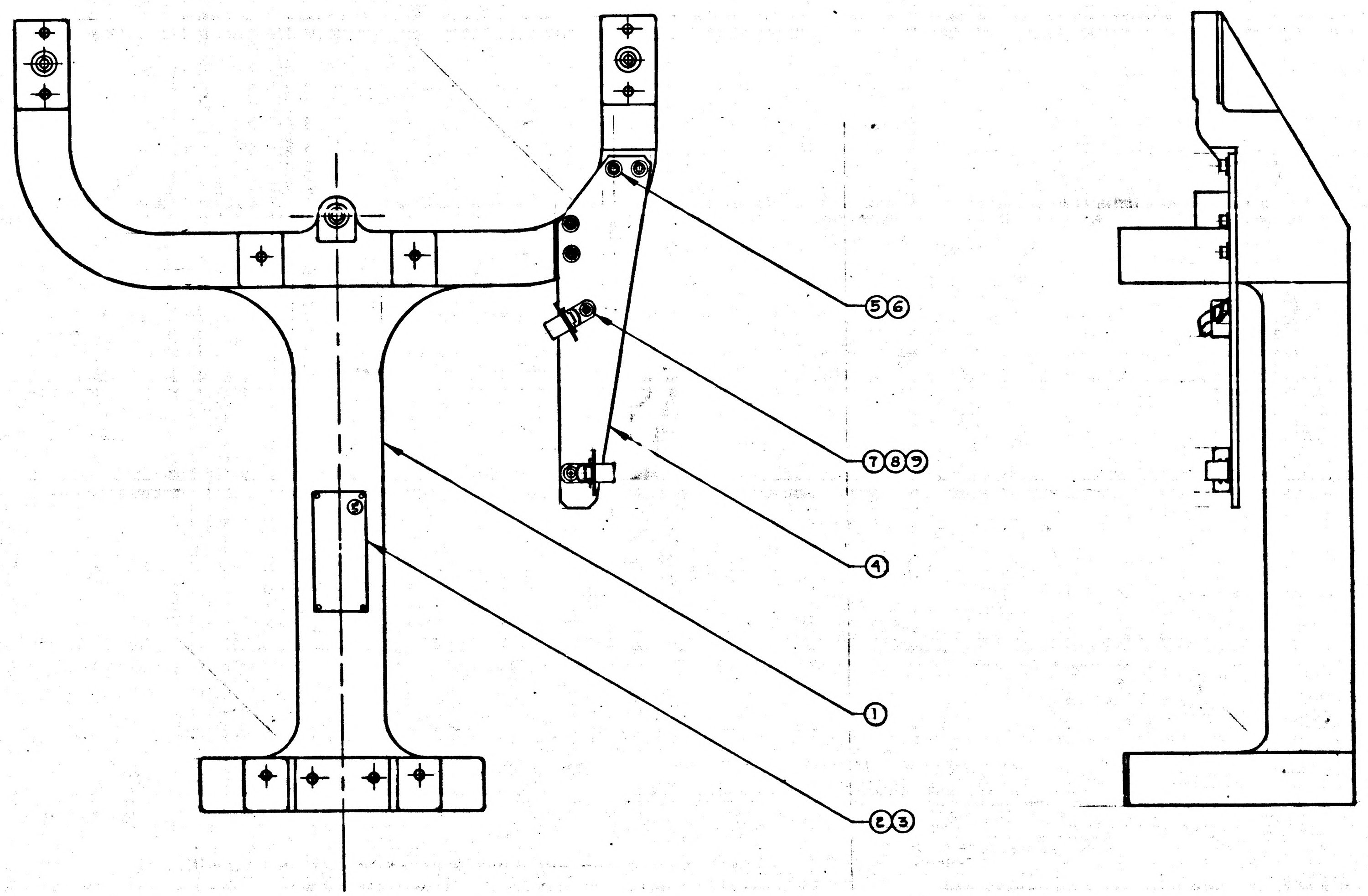
MASTER

E-154

1019848

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTE:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION
9	4		MS21295-10			SCREW, SELF-LOCKING, CYLINDRICAL HD		
8	4		AN960C10L			WASHER, FLAT, PLAIN		
7	2		1016105-003			STRAP ASSEMBLY - HARNESS		
6	4		1017479-32	74455039032		SCREW, CAP HEX SOC HD		
5	4		MS35337-82	74439050006		WASHER, LOCK		
4	1		1019354	16020180500		PLATE, SUPPORT		
3	4		MS24646-1	74455075001		SCREW, SELF TAPPING		
2	1		1019361	16020180510		PLATE, IDENTIFICATION		
1	1		1019670	16020180030		FRAME, DUMMY NAVIGATION BASE (MACH)		

LIST OF PARTS AND MATERIALS

1019665	1019720
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17020180180
DRAWN R CARROLL DATE 9-10-64
CHECKED 9-22-64
APPROVAL 9-22-64
APPROVAL
NASA APPROVAL 10-14-64
10/14/64
MIT APPROVAL 10/14/64

17020180180

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DUMMY NAV BASE
FRAME ASSEMBLY

CODE IDENT NO. SIZE E NASA NUMBER 1019848
SCALE 1/2 WEIGHT CALC ACTUAL SHEET OF 1

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 13423 DATE 10/14/64

MASTER

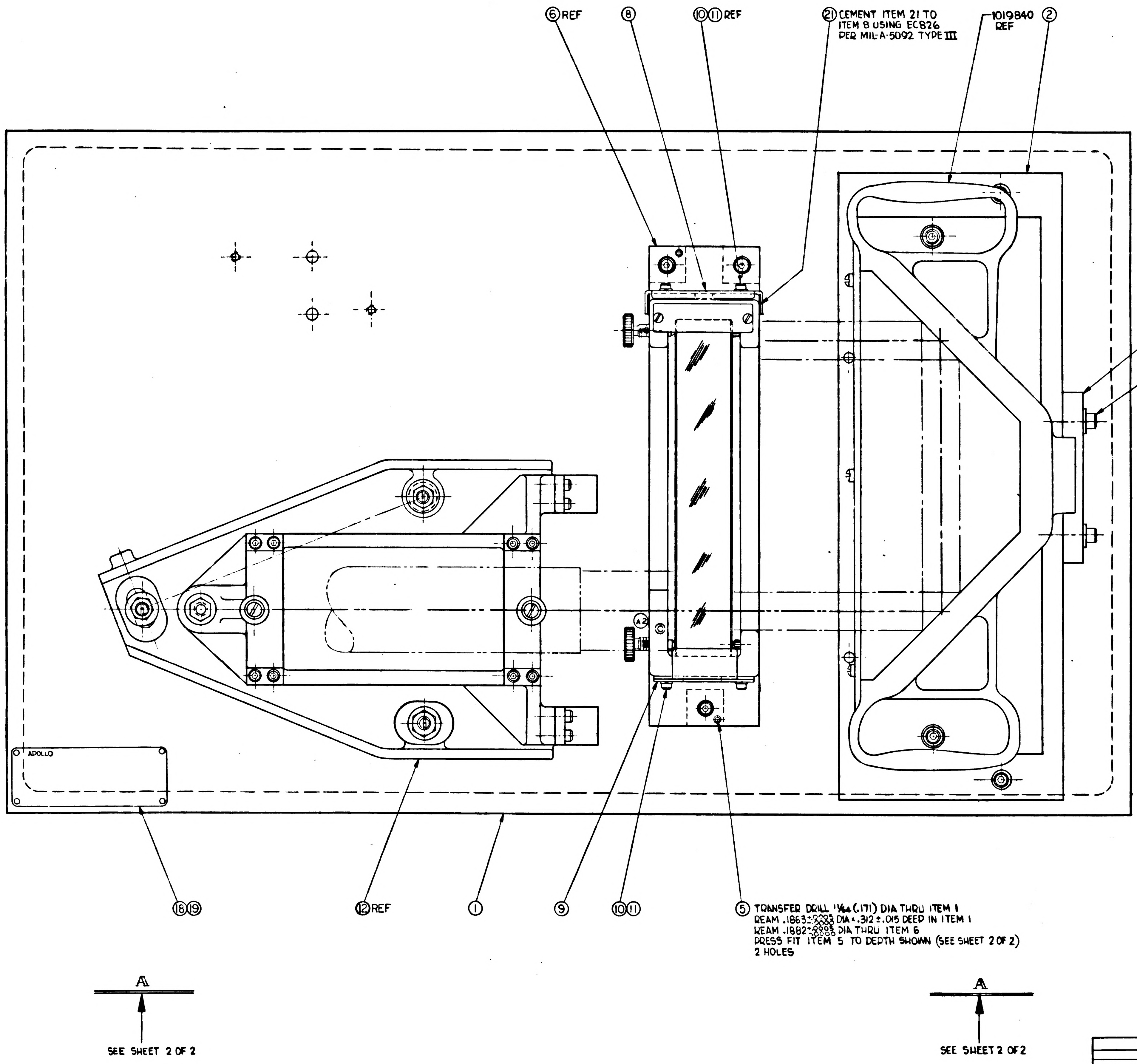
1019848

A 1019849

REVISIONS TDRR 15285

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A3		REVISED PER 109316 TDRR 16946 DATE: 3-2-65	3-11-66 ALR	3-17-66

NOTES:
1- INTERPRET DRAWING PER MIL-D-70327
2 GENERAL MACHINING STANDARD PER ND1002078
3- REMOVE BURRS PER ND1002079



㉑ CEMENT ITEM 21 TO ITEM 8 USING EC826 PER MIL-A-5092 TYPE III

⑤ TRANSFER DRILL 11/64 (.171) DIA THRU ITEM 1
REAM $.1863^{+.0005}_{-.0000}$ DIA × .312 ± .015 DEEP IN ITEM 1
REAM $.1882^{+.0005}_{-.0000}$ DIA THRU ITEM 6
PRESS FIT ITEM 5 TO DEPTH SHOWN (SEE SHEET 2 OF 2)
2 HOLES

SEE SHEET 2 OF 2

SEE SHEET 2 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
25	2		1017418-36	74455058036		SCREW, CAP, SOC HD			
24	2		AN960C416	74468051006		WASHER, FLAT			
23	1		1019847	02386900186		PLATE AND PAD ASSY			
22									
21	2		1019284	16020080110		PAD			
20	1		1019755	02386900146		COUNTERWEIGHT ASSY			
19	4		MS24646-1	74455075001		SCREW, SELF TAPPING			
18	1		1019359	03386900930		PLATE, IDENTIFICATION			
17	1		1017413	01386900016		AUTOCOLLIMATOR, 2 PLANE READING			
16	6		AN365-616	74443049006		NUT, ELASTIC STOP			
15	3		1010403-007	74468040007		WASHER, SPRING TENSION			
14	6	Ⓐ3	MS15795-314	74468072014		WASHER, FLAT			
13	3		1017215	03386900574		STUD, LOCATING			
12	1		1016955	02386900089		MOUNT ASSY, COLLIMATOR			
11	4		MS35337-80	74439050004		WASHER, LOCK, SPLIT			
10	4		1017418-17	74455058017		SCREW, CAP, SOC HD			
9	1		1017203	16020080020		BRACKET, MOUNTING			
8	1		1017201	16020080040		BRACKET, MOUNTING			
7	1		1017434	18020090000		PLANE, PARALLEL REFERENCE MIRROR			
6	1		1017198	16020080070		SUPPORT, MOUNTING			
5	2		1017415-79	73002105115		PIN, DOWEL			
4	7		MS35337-82	74439050006		WASHER, LOCK, SPLIT			
3	7		1017418-37	74455058037		SCREW, CAP, SOC HD			
2	1		1019846	02386900185		RETROREFLECTING PRISM SUPPORT ASSY			
1	1		1017197	16020080010		BASE PLATE, DRILLING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1019840

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900189
DRAWN A.S. Adolfi DATE 8-27-64
CHECKED 8-31-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

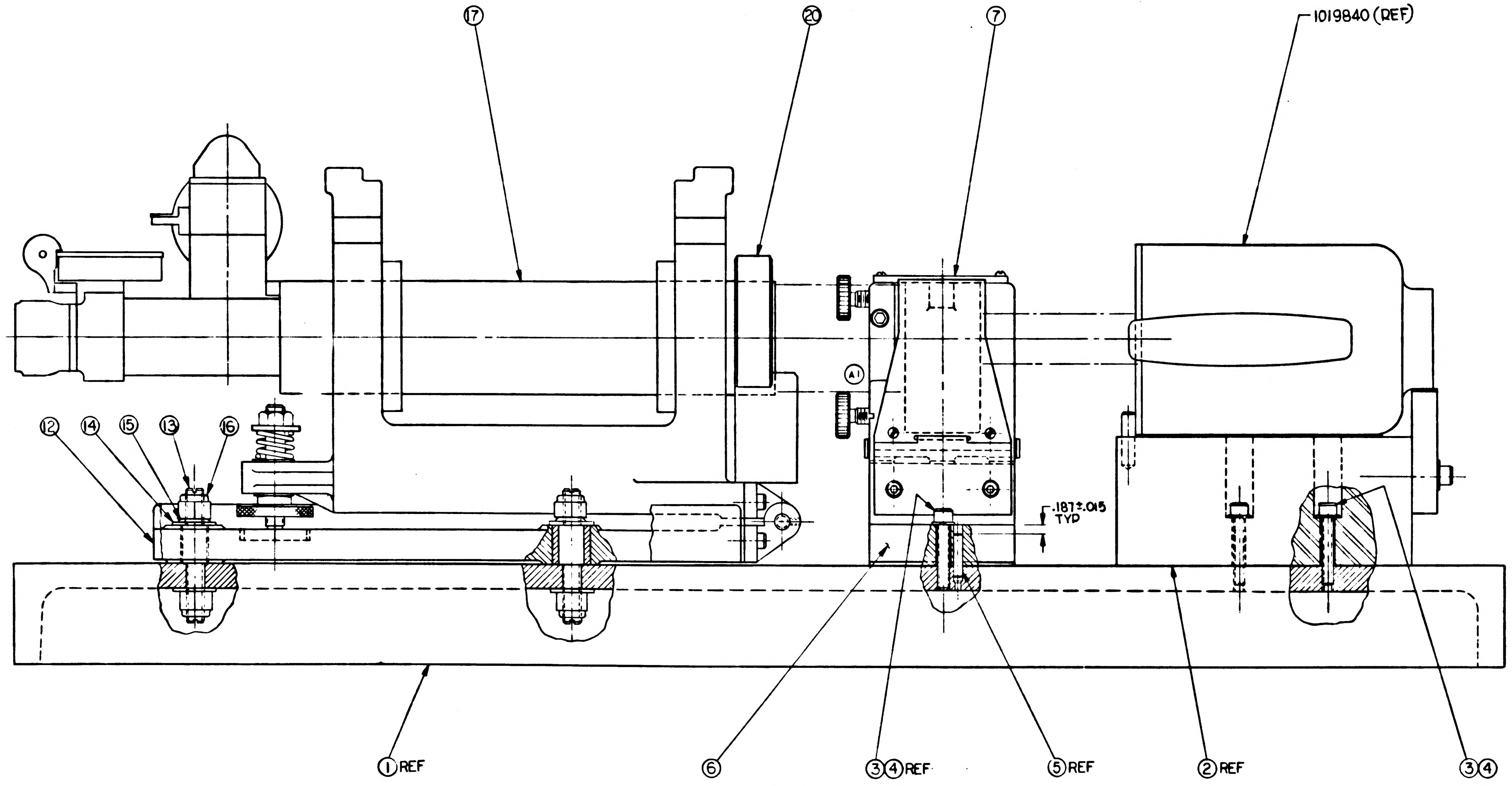
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
CERTIFICATION FIXTURE

CODE IDENT NO.
SIZE E
NASA NUMBER 1019849
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019849 A

REVISIONS TDRR 15225				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A3		SEE SHEET 1 OF 2	3-11-65	BM.



VIEW A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT W.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1019840

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ –	+ –	+ –

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 180200800000

DRAWN A.S. Andolfi DATE 8-27-64
CHECKED L. MORGAN 8-31-64
APPROVAL 9-2-64
APPROVAL

NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING DRISM
CERTIFICATION FIXTURE

CODE IDENT NO.
SIZE E
NASA NUMBER 1019849

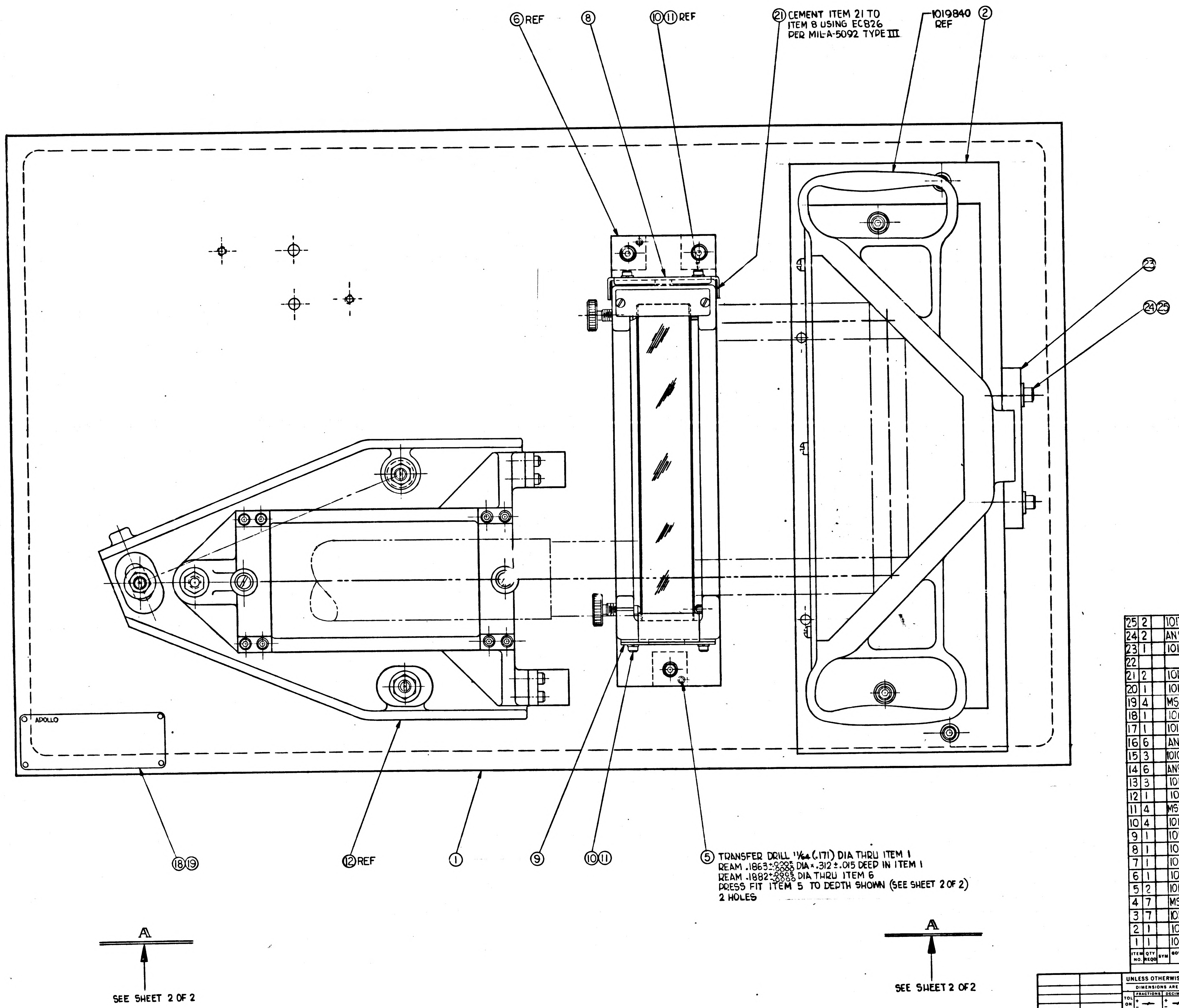
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019849

REVISIONS TDRR 15285 1/165

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DRAWING PER MIL-D-70327
2 GENERAL MACHINING STANDARD PER ND1002078
3 REMOVE BURRS PER ND1002079



⑤ TRANSFER DRILL 11/64 (.171) DIA THRU ITEM 1
REAM .1863 +.0005 -.0000 DIA × .312 ± .015 DEEP IN ITEM 1
REAM .1882 +.0005 -.0000 DIA THRU ITEM 6
PRESS FIT ITEM 5 TO DEPTH SHOWN (SEE SHEET 2 OF 2)
2 HOLES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
25	2		1017418-36	74455058036		SCREW, CAP, SOC HD			
24	2		AN960-C416	74468051006		WASHER, FLAT			
23	1		1019847	02386900186		PLATE AND PAD ASSY			
22									
21	2		1019284	16020080110		PAD			
20	1		1019755	02386900146		COUNTERWEIGHT ASSY			
19	4		MS24646-1	74455075001		SCREW, SELF TAPPING			
18	1		1019359	03386900930		PLATE, IDENTIFICATION			
17	1		1017413	01386900016		AUTOCOLLIMATOR, 2 PLANE READING			
16	6		AN365-616	74443049006		NUT, ELASTIC STOP			
15	3		1010403-007	74468040007		WASHER, SPRING TENSION			
14	6		AN960-C616L	74468050008		WASHER, FLAT			
13	3		1017215	03386900574		STUD, LOCATING			
12	1		1016955	02386900089		MOUNT ASSY, COLLIMATOR			
11	4		MS35337-80	74439050004		WASHER, LOCK, SPLIT			
10	4		1017418-17	74455058017		SCREW, CAP, SOC HD			
9	1		1017203	16020080020		BRACKET, MOUNTING			
8	1		1017201	16020080040		BRACKET, MOUNTING			
7	1		1017434	18020090000		PLANE, PARALLEL REFERENCE MIRROR			
6	1		1017198	16020080070		SUPPORT, MOUNTING			
5	2		1017415-79	73002105115		PIN, DOWEL			
4	7		MS35337-82	74439050006		WASHER, LOCK, SPLIT			
3	7		1017418-37	74455058037		SCREW, CAP, SOC HD			
2	1		1019846	02386900185		RETROREFLECTING PRISM SUPPORT ASSY			
1	1		1017197	16020080010		BASE PLATE, DRILLING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1019840

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386900189
DRAWN A.S. Andolfi DATE 8-27-64
CHECKED L. Morgan 8-31-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
CERTIFICATION FIXTURE

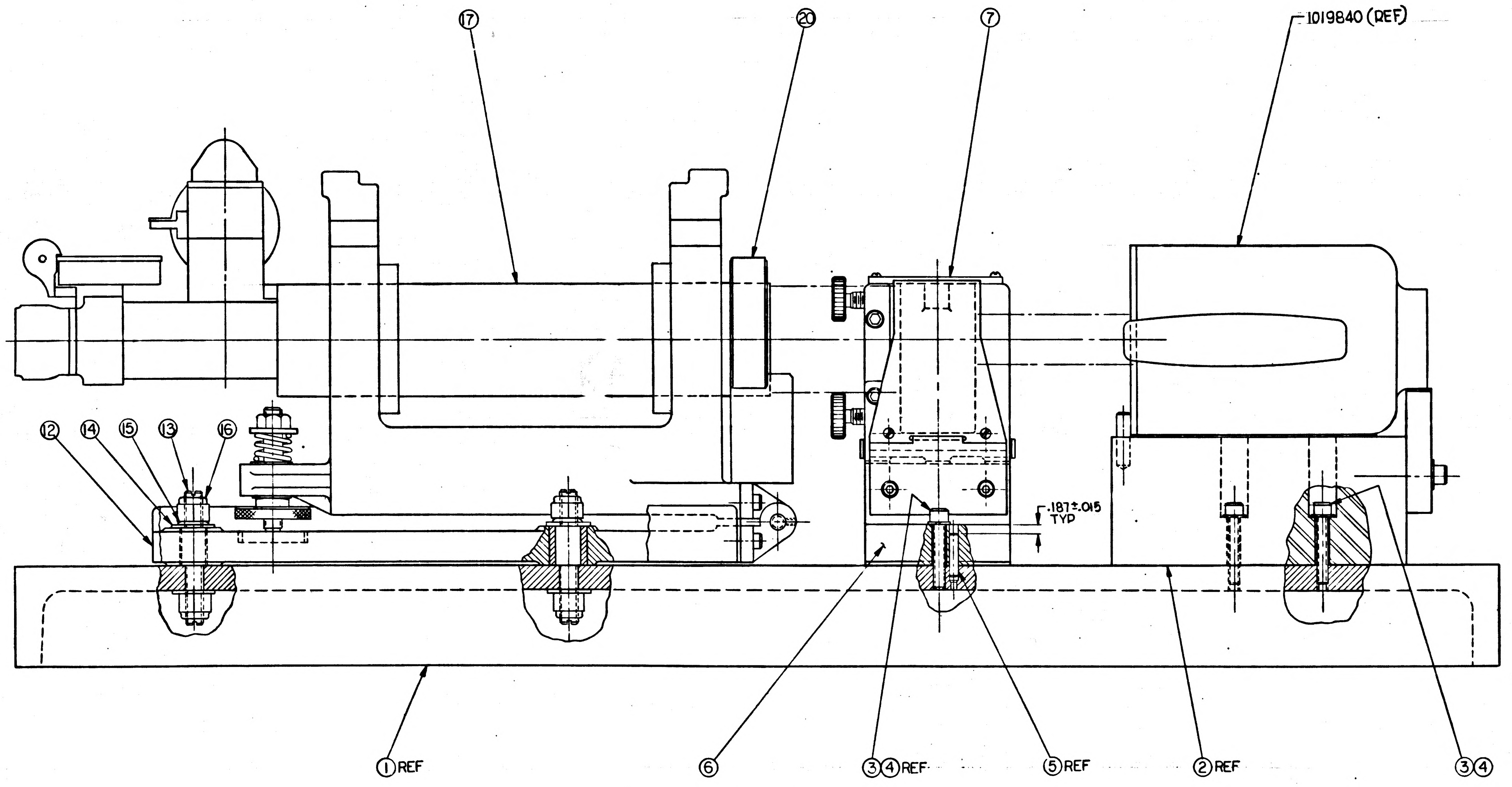
CODE IDENT NO.
SIZE E
NASA NUMBER 1019849
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019849

1019849

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 15725 11/6/65



VIEW A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
	1019840

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 18020080000
DRAWN A.S. Andolfi DATE 8-27-64
CHECKED L. MORGAN 8-31-64
APPROVAL 9-2-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETROREFLECTING PRISM
CERTIFICATION FIXTURE

CODE IDENT NO.
SIZE E
NASA NUMBER 1019849
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REL		CLASS A RELEASE PER TDRR [illegible]		
A6	–	REVISED PER E.O. 114412 TDRR 25638 DATE 1-25-66	2-19-66	2-21-66

NOTE:

1. INTERPRET DWG PER MIL-D-70327.
2. REFER TO SCHEMATIC DIAGRAM 1019898 Ⓐ
3. SERIALIZE PER ND 1002023 AT LOCATION SHOWN BY RUBBER STAMPING 1/8 HIGH WITH BLACK INK PER DWG.NO. 1001911.
4. APPLY A PROTECTIVE COAT OF VARNISH TO BOARD PER MIL-V-173 DO NOT COAT CONNECTOR CONTACTS OR INSERTION GUIDE PINS
5. WIRE PER ND1002032
6. SOLDER PER ND1002071
7. SECURE ITEM NOS 11 THRU 16 TO ITEMS 5 AND 6 USING ITEM NO. 10
8. FOR THE SELECTION OF COMPONENTS C2, C3, R7, SEE SELECTION CHARTS A, B, AND C, OF 1019904 SHEET 1.

TEST REQUIREMENTS FOR -011 UNIT

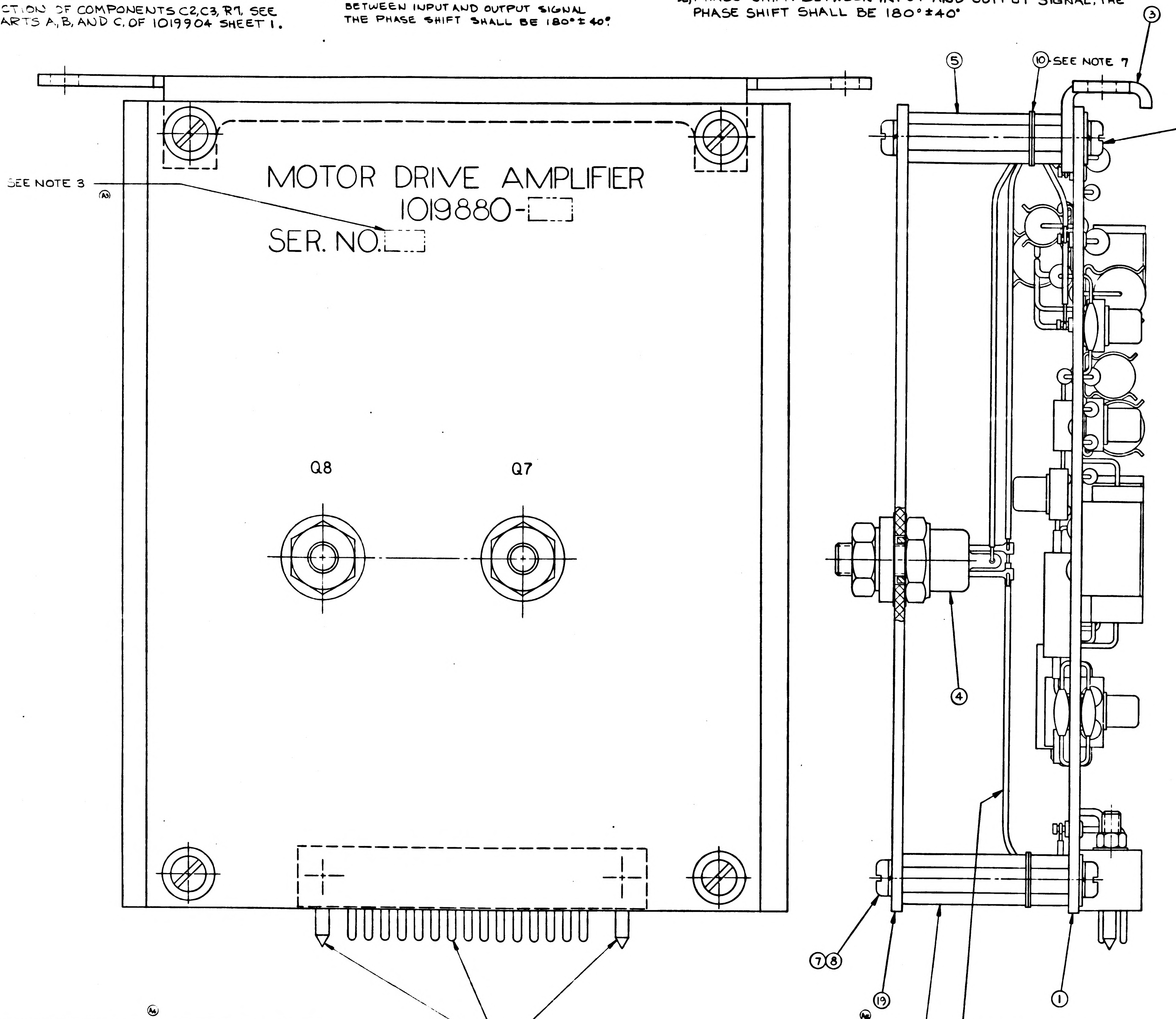
1. a) CONNECT 28VDC TO P1-M CONNECT 10VDC TO P1-A CONNECT DC RETURNS TO P1-S CONNECT 28V 800±8CPS BETWEEN P1-K AND P1-H. CONNECT LOAD P/N 1010430 ACROSS P1-B AND P1-R. CONNECT CENTER TAP OF LOAD TO 28VDC. CONNECT INPUT (800±8CPS IN PHASE OR OUT OF PHASE WITH 800~ SIGNAL ABOVE.
   b) GAIN: 1000 AT F ± 25%
   $C \cong F \pm 10\%$
   $E \cong F\left(\frac{806}{174}\right) \pm 10\%$
   c) PHASE SHIFT: BETWEEN INPUT AND OUTPUT SIGNAL THE PHASE SHIFT SHALL BE 180° ± 40°

Ⓐ TEST REQUIREMENTS FOR -021 UNIT

1a) CONNECT 28VDC TO P1-M, CONNECT 10VDC TO P1-A, CONNECT DC. RETURNS TO P1-S, CONNECT 28V 800±8CPS BETWEEN P1-K AND P1-H, CONNECT LOAD P/N 1010430 OR EQUIVALENT ACROSS P1-B, AND P1-R, CONNECT CENTER TAP OF LOAD TO 28VDC, CONNECT INPUT (800±8CPS) IN PHASE OR OUT OF PHASE WITH 800~ SIGNAL ABOVE.

b) GAIN: WITH A 0° PHASE LEADING OR LAGGING AND 3 MILLIVOLT INPUT APPLIED TO PIN E WITH F AND C GROUNDED AND 0° PHASE APPLIED TO REFERENCE PINS H AND K, THE IN PHASE OUTPUT MINIMUM SHALL BE 18V±3VAC AND 30VAC MAXIMUM OUTPUT WHEN REFERENCE TO PINS H AND K ARE REVERSED.

c) PHASE SHIFT: BETWEEN INPUT AND OUTPUT SIGNAL, THE PHASE SHIFT SHALL BE 180° ± 40°



Ⓐ

WIRING LEGEND					
CONDUCTOR NO	ITEM NO.	COLOR	FROM	TO	LENGTH ±.250
1	11	GRN	E1	Q7-C	7.750
2	12	YEL	E2	Q7-E	7.750
3	13	WHT/BLUE	E3	Q8-B	7.750
4	14	WHT/GRN	E4	Q8-C	7.750
5	15	WHT/YEL	E5	Q8-E	7.750
6	16	BLUE	E6	Q7-B	7.750

QTY REQD -021	ITEM NO.	QTY REQD -011	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	19	–		1022575	02386912039		HEAT SINK, MOTOR DRIVE AMPL.			
REF	13	REF		1019898	02386910072		SCHEMATIC DIAGRAM			
2	17	2		MS35233-15	74455054015		SCREW, MACHINE, PAN HD			
8"	16	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (BLUE)			
8"	15	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/YEL)			
8"	14	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/GRN)			
8"	13	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/BLUE)			
8"	12	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (YEL)			
8"	11	8"		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (GRN)			
16"	10	16"		[illegible]-2	60035037002		TAPE, TEXTILE			
4	9	4		AN960-C4L	74468050002		WASHER, FLAT, LIGHT			
8	8	8		MS35338-78	74439003002		WASHER, LOCK, SPLIT			
6	7	6		MS35233-14	74455054014		SCREW, MACHINE, PAN HD			
2	6	2		1019594-1	03386910395		SPACER, NUT			
2	5	2		1019594-2	03386910396		SPACER, NUT			
1PR	4	1PR		1001802-006			TRANSISTOR, SILICON, NPN (Q7, Q8)			
1	3	1		1019417	03386910042		HANDLE, BRACKET			
–	2	1		1019595	03386910401		HEAT SINK, MOTOR DRIVE AMPLIFIER			
1	1	1		1019904-011	02386910135		MOTOR DRIVE AMPLIFIER, SUB-ASSY			

Ⓐ LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910136
DRAWN J.D. DUNN DATE 3-9-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOTOR DRIVE AMPLIFIER
ASSEMBLY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019880
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NEXT ASSY	USED ON
[illegible]	[illegible]
APPLICATION	

CONTRACT NAS9-497

MASTER

NOTE:

1. INTERPRET DWG PER MIL-D-70327.
2. REFER TO SCHEMATIC DIAGRAM 1019898
3. SERIALIZE PER ND 1002023
4. APPLY A PROTECTIVE COAT OF VARNISH TO BOARD PER MIL-V-173 DO NOT COAT CONNECTOR CONTACTS OR INSERTION GUIDE PINS
5. WIRE PER ND1002032
6. SOLDER PER ND1002071
7. SECURE ITEM NOS. 11 THRU 16 TO ITEMS 5 AND 6 USING ITEM NO 10

NOTES CONTINUED:

8. a) CONNECT 28VDC TO P1-M CONNECT 10VDC TO P1-A CONNECT DC RETURNS TO P1-S CONNECT 28V 800±8CPS BETWEEN P1-K AND P1-H. CONNECT LOAD P/N 1010430 ACROSS P1-B AND P1-R. CONNECT CENTER TAP OF LOAD TO 28VDC, CONNECT INPUT (800±8CPS IN PHASE OR OUT OF PHASE WITH 800~ SIGNAL ABOVE.

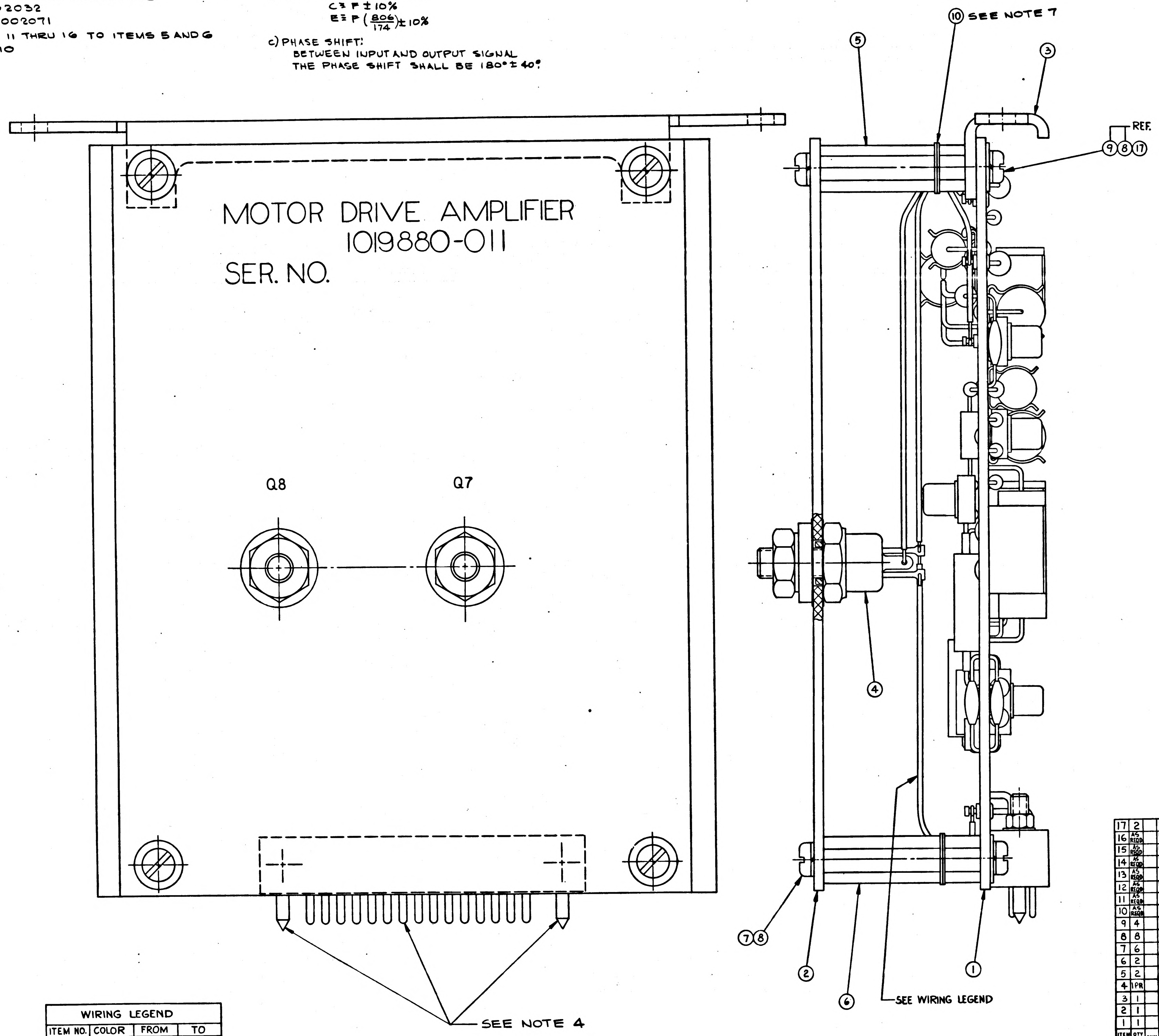
b) GAIN: 1000 AT F ± 25%

$C = F \pm 10\%$

$E = F\left(\frac{806}{174}\right) \pm 10\%$

c) PHASE SHIFT: BETWEEN INPUT AND OUTPUT SIGNAL THE PHASE SHIFT SHALL BE 180° ± 40°

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	—	CLASS A RELEASE PER TDRR 21713		



WIRING LEGEND			
ITEM NO.	COLOR	FROM	TO
11	GRN	E1	Q7-C
12	YEL	E2	Q7-E
13	WHT/BLUE	E3	Q8-B
14	WHT/GRN	E4	Q8-C
15	WHT/YEL	E5	Q8-E
16	BLUE	E6	Q7-B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
17	2		MS35233-15	74455054015		SCREW, MACHINE, PAN HD			
16	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (BLUE)			
15	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/YEL)			
14	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/GRN)			
13	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (WHT/BLUE)			
12	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (YEL)			
11	AS REQD		MIL-W-16878C TYPE EE-22			WIRE, ELECTRICAL (GRN)			
10	AS REQD		1001670-2	60035037002		TAPE, TEXTILE			
9	4		AN960-C4L	74468050002		WASHER, FLAT, LIGHT			
8	8		MS35338-78	74439003002		WASHER, LOCK, SPLIT			
7	6		MS35233-14	74455054014		SCREW, MACHINE, PAN HD			
6	2		1019594-1	03386910395		SPACER, NUT			
5	2		1019594-2	03386910396		SPACER, NUT			
4	1PR		1001802-002			TRANSISTOR, SILICON, NPN (Q7, Q8)			
3	1		1019417	03386910042		HANDLE, BRACKET			
2	1		1019595	03386910401		HEAT SINK, MOTOR DRIVE AMPLIFIER			
1	1		1019904-011	02386910135		MOTOR DRIVE AMPLIFIER, SUB-ASSY			
	-011		LIST OF PARTS AND MATERIALS						

1017389	1016949
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910136
DRAWN: J.D.DUNN DATE 3-9-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOTOR DRIVE AMPLIFIER
ASSEMBLY

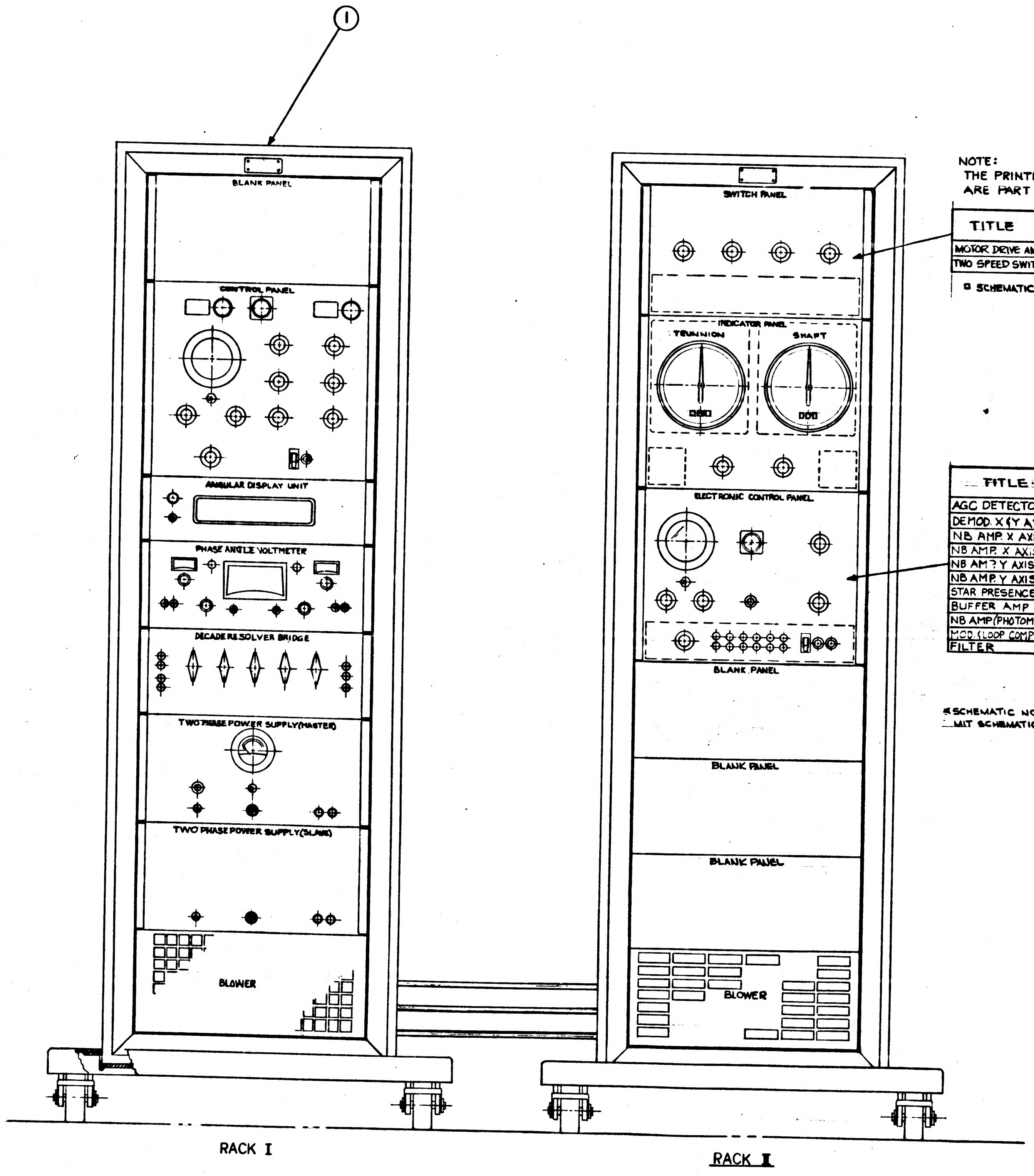
CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019880
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019880

MASTER

MASTER

REVISIONS 16388				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


①
BLANK PANEL
CONTROL PANEL
ANGULAR DISPLAY UNIT
PHASE ANGLE VOLTMETER
DECADE RESOLVER BRIDGE
TWO PHASE POWER SUPPLY(MASTER)
TWO PHASE POWER SUPPLY(SLAVE)
BLOWER
RACK I
SWITCH PANEL
INDICATOR PANEL
TRUNNION
SHAFT
ELECTRONIC CONTROL PANEL
BLANK PANEL
BLANK PANEL
BLANK PANEL
BLOWER
RACK II

NOTE:
THE PRINTED CIRCUIT BOARD ASSY'S LISTED BELOW
ARE PART OF THE PANEL ASSY'S INDICATED.

TITLE	KIC CIRCUITS	SAME AS MIT AIRBORNE CIRCUITS	MIT AIRBORNE CIRCUITS				NO. REQ'D
	SCHEMATIC NO.	FINAL ASSY NO.	SCHEMATIC NO.	REV LTR	FINAL ASSY NO.	REV LTR	
MOTOR DRIVE AMP	02386910072	02386910136	1015116 ◽	K	1015121	T	4
TWO SPEED SWITCH	02386910054	02386910057	1009505	A	07522	–	2

◽ SCHEMATIC NO. 1015116 IS AN "AC" AIRBORNE CIRCUIT

TITLE	KIC CIRCUITS	SAME AS MIT AIRBORNE CIRCUITS	MIT AIRBORNE CIRCUITS				NO REQ'D
	SCHEMATIC NO.	FINAL ASSY NO.	SCHEMATIC NO.	REV LTR	FINAL ASSY NO.	REV LTR	
AGC DETECTOR	02386910044	02386910046	1009520	A	1007566	A	1
DEMOD. X&Y AXIS	02386910045	02386910050	1009511	A	1007512	A	1
NB AMP. X AXIS FUND	02386910025	02386910040	1009520	A	1007566	A	1
NB AMP. X AXIS HARM	02386910033	02386910030	1009520	A	1007566	A	1
NB AMP. Y AXIS FUND	02386910021	02386910041	1009511	A	1007512	A	1
NB AMP. Y AXIS HARM	02386910034	02386910042	1009511	A	1007512	A	1
STAR PRESENCE AMP	02386910071	02386910148	1009508	–	1007559	A	1
BUFFER AMP	02386910154	02386910149	NOT APPLICABLE	–	NOT APPLICABLE	–	1
NB AMP (PHOTOMETER)	02386910070	02386910078	1009508	–	1007559	A	1
MOD. (LOOP COMPENSATOR)	02386910062*	02386910061	1009521	A	1007511	A	2
FILTER	02386910155	02386910150	NOT APPLICABLE	–	NOT APPLICABLE	–	1

*SCHEMATIC NO. 02386910062 IS IDENTICAL TO
MIT SCHEMATIC NO. 1009521 EXCEPT FOR VALUE OF "C1"

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1		1016949	18020110000		FUNCTIONAL TESTER, ASSEMBLY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± –//– DECIMALS ± –//– ANGLES ± –//–
DO NOT SCALE THIS DRAWING
MATERIAL –//–
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910025
DRAWN R. De Carlo DATE 2-1-65
CHECKED Bul D. Muse 2-1-65
APPROVAL Dellupe 2-4-65
APPROVAL
NASA APPROVAL A.C. 2/10/65
Wehh 2-9-65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MECHANIZATION DWG
BLOCK I (100 SERIES) –
BLOCK I FUNTIONAL TESTER

CODE IDENT NO.
SIZE E
NASA NUMBER 1019890
SCALE 1/4
WEIGHT CALC ACTUAL
SHEET 1 OF 9

MECHANIZATION DRAWING

FOR BLOCK I (100 SERIES)-

BLOCK II FUNCTIONAL TESTER.

1 SCOPE

1-1 PURPOSE. This ~~specification~~ drawing establishes the requirements for the Functional Tester.

2 DESCRIPTION. The tester provides the electronics necessary to support the Optical Unit Assembly (OUA) testing. The Functional Tester will consist of two test racks, physically separate and capable of interconnections by cables, and are designated Rack I and Rack II.

The design philosophy of this tester is to provide the following functions:

2-1 RACK I USED ALONE; (for Block I OUA Configuration only).

a) Commands for driving the shaft and trunnion drives of the Scanning Telescope and Sextant. (SCT alone or SXT alone) (But not both simultaneously).

b) Angular position read-out of the Optical Unit sextant 16 and 64 speed resolvers.

c) Measurement of breakaway and running voltages of Optical Unit drive trains.

d) Measurement of generator output and resolver null voltages.

Rack I is equipped with manual positioned resolver transmitter units that provide the commands for shaft and trunnion drives of the SCT and SXT, bridge type readout of 16 and 64 speed resolvers, variable voltage and voltmeter for measurement of breakaway and running output and resolver null voltages, and a two phase, 800 cycle power supply. Rack I is the same as Block I Functional Tester except for internal cable changes which permits interconnection to Rack II.

2-2 RACK II used with RACK I (for Block 1-100 and Block II Configuration).

a) Commands for driving the shaft and trunnion drives of the Scanning telescope (SCT) and Sextant (SXT).

b) Angular position readout of the OUA Sextant 16 and 64 speed resolvers.

c) Measurement of breakaway and running voltages of OUA drive trains.

d) Measurement of generator output and resolver null voltages.

e) Measurement of OUA Photometer output signals.

f) Measurement of OUA Tracker output signals.

3. DESIGN CHARACTERISTICS. Rack II is equipped with two speed motor driven precision resolver receiver units and their associated switches and drive amplifiers that provide the commands for the shaft and trunnion drives of the SCT and SXT. Rack II also contains the electronics necessary to provide tracker and photometer signal measurement.

3-1 TRUNNION AND SHAFT RESOLVER UNITS. Each Unit consists of two resolver receivers to drive the SXT, a resolver transmitter to drive the SCT, a counter indicating degrees, and a dial readable to 10 seconds of arc of the axis position. Manual positioning capability will be on the order of ± 3 arc seconds.

3-2 PHOTOMETER ELECTRONICS. The tester will contain a Narrow Band Amplifier whose input impedance, center frequency, bandwidth and gain are identical to the requirements of the airborne Photometer Narrow Band Amplifier (as listed on page 1 of this specification) for Block I-100 and Block II, and a narrow band pass filter to further the readout of the signal frequency.

3-3 TRACKER ELECTRONICS. The Tester will contain Narrow Band Amplifiers, Detectors, Demodulators, Modulators, and a Star Presence Amplifier whose functional parameters will be identical to the requirements of the airborne Tracker circuitry (as listed on page 1 of this specification) for Block I-100 and Block II. Buffer amplifiers will be provided to enable Tuning Fork signal frequency measurements to be made on a laboratory type electronic counter.

3-4 SERVO DRIVE ELECTRONICS. The tester will contain those Two Speed Switches and Motor Drive Amplifiers necessary to drive the SXT and SCT.

3-5 RACK I

3-5.1 Rack I will be a Block I Functional Tester 1016949, with the following modification:

a) Connector Panel will require the addition of terminal boards and connectors.

b) Cable W7 will be removed and replaced with three new cables. One from connector panel to terminal board, one from terminal board to control panel and one from terminal board to decade resolver bridge.

c) Cable W6 will be removed and replaced with three new cables. One from connector panel to terminal board, one from terminal board to control panel and one from terminal board to phase angle voltmeter and decade resolver bridge.

d) Cable W4 will be removed and replaced with three new cables. One from connector panel to terminal board, one from terminal board to control panel and one from terminal board to two phase power supply.

3-6 The following Power and Readout will be supplied by Block I Functional Tester: (No change from present configuration):

3-6.1 Resolver Bridge Readout. Bridge readout is from 0 to 360° in 0.001° steps. Angular accuracy of readout is within ±2 arc seconds. Input impedance to bridge is approximately 500 K-ohms.

3-6.2 Null Meter. The null meter is capable of reading in-phase voltage to 1 millivolt.

3-6.3 Variable Voltage Circuit. The variable voltage circuit shall be capable of supplying variable voltage between 0 to 10 volts.

3-6.4 800 cycle power source. The 800 cycle source provides the following:

a) 28 volts ± 1 volt
b) 800 CPS ± 2%
c) Two phases at 50 watts per phase

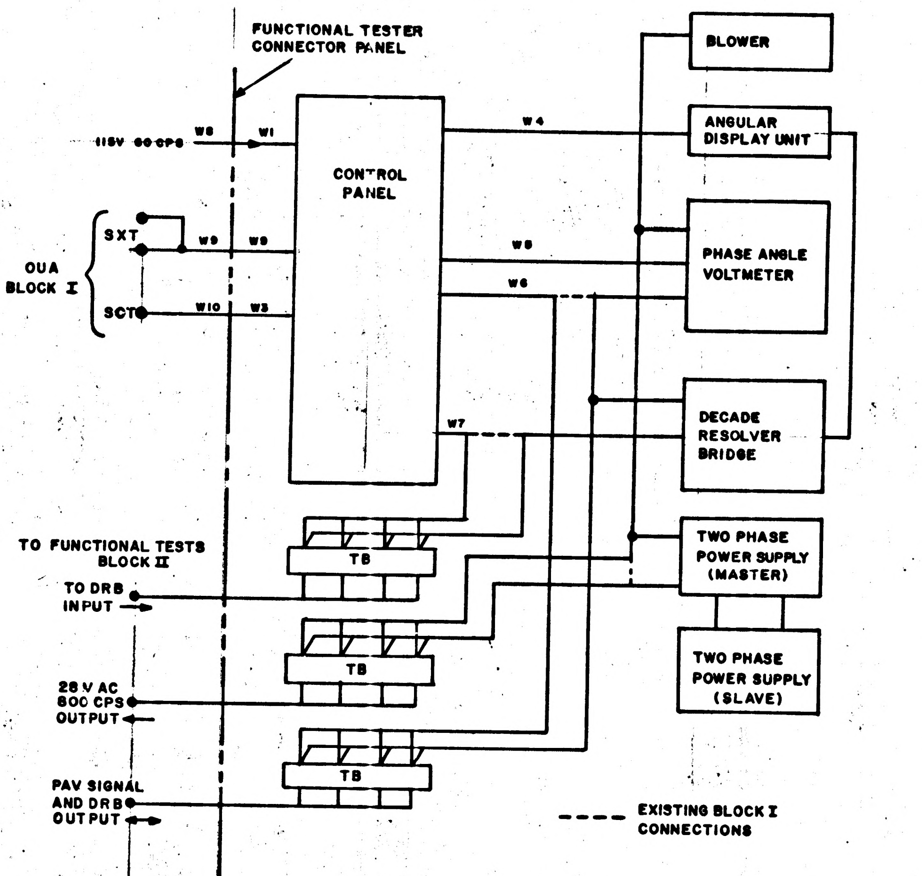

FUNCTIONAL TESTER CONNECTOR PANEL
115V 60 CPS
W8
W1
CONTROL PANEL
OUA BLOCK I
SXT
SCT
W9
W2
W10
W3
W4
W5
W6
W7
BLOWER
ANGULAR DISPLAY UNIT
PHASE ANGLE VOLTMETER
DECADE RESOLVER BRIDGE
TWO PHASE POWER SUPPLY (MASTER)
TWO PHASE POWER SUPPLY (SLAVE)
TO FUNCTIONAL TESTS BLOCK II
TO DRB INPUT
28 V AC 800 CPS OUTPUT
PAV SIGNAL AND DRB OUTPUT
TB
TB
TB
EXISTING BLOCK I CONNECTIONS

FIGURE 2. BLOCK I & BLOCK II INTERCONNECTING DIAGRAM

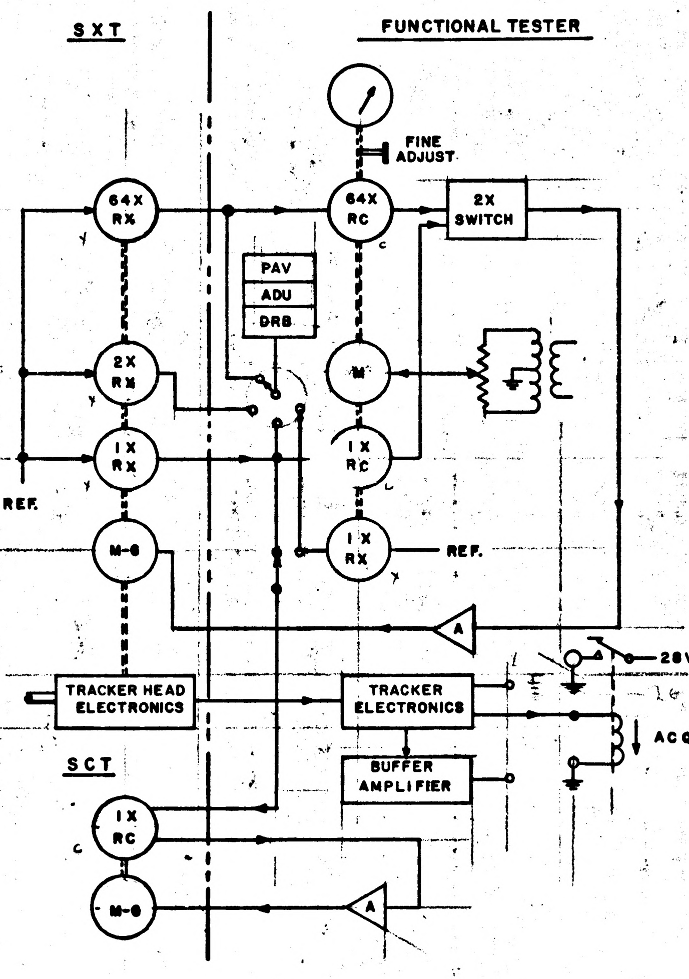

SXT
FUNCTIONAL TESTER
FINE ADJUST
64X RX
64X RC
2X SWITCH
PAV
ADU
DRB
2X RX
1X RX
1X RC
1X RX
REF.
REF.
M-G
A
28VDC
TRACKER HEAD ELECTRONICS
TRACKER ELECTRONICS
BUFFER AMPLIFIER
ACQ
SCT
1X RC
M-G
A

FIGURE 3. BLOCK II TRUNNION AXIS–FUNCTIONAL TESTER TIE–IN

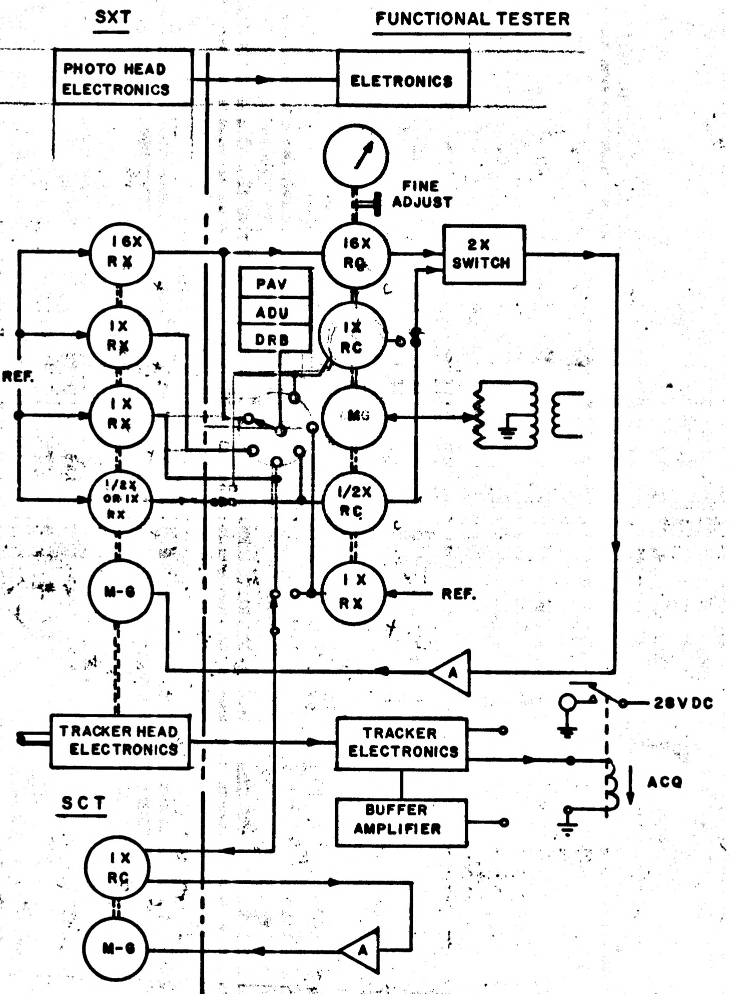

SXT
FUNCTIONAL TESTER
PHOTO HEAD ELECTRONICS
ELETRONICS
FINE ADJUST
16X RX
16X RC
2X SWITCH
PAV
ADU
DRB
1X RX
1X RC
REF.
1X RX
MG
1/2X OR 1X RX
1/2X RC
1X RX
REF.
M-G
A
28VDC
TRACKER HEAD ELECTRONICS
TRACKER ELECTRONICS
ACQ
BUFFER AMPLIFIER
SCT
1X RC
M-G
A

FIGURE 4. BLOCK II SHAFT AXIS–FUNCTIONAL TESTER TIE–IN

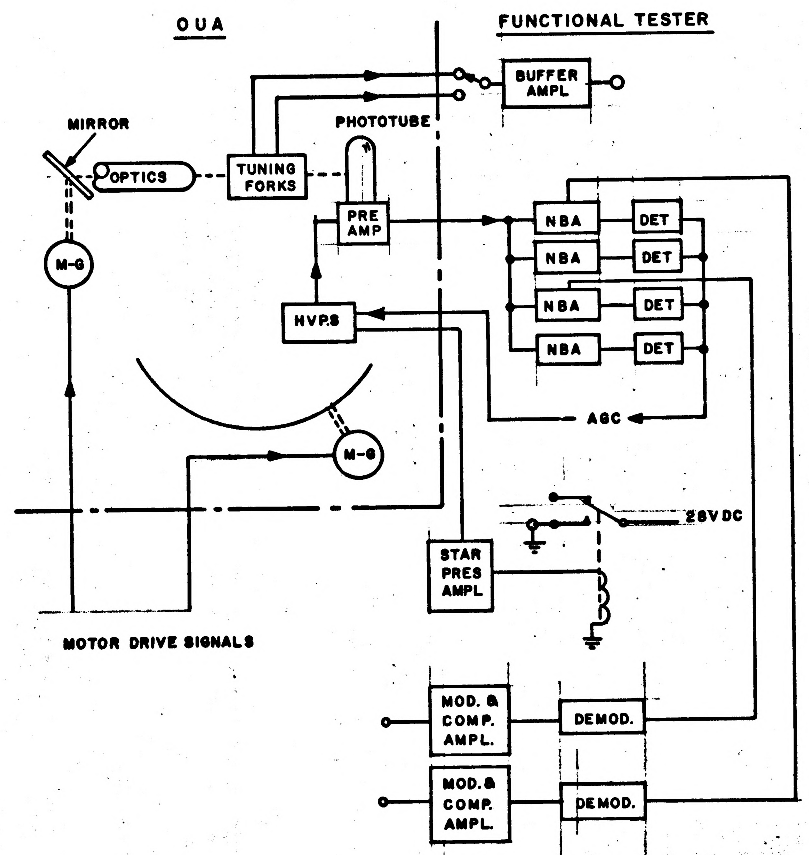

OUA
FUNCTIONAL TESTER
BUFFER AMPL
MIRROR
OPTICS
TUNING FORKS
PHOTOTUBE
PRE AMP
NBA
NBA
NBA
NBA
DET
DET
DET
DET
M-G
HVPS
AGC
M-G
28VDC
STAR PRES AMPL
MOTOR DRIVE SIGNALS
MOD. & COMP. AMPL.
DEMOD.
MOD. & COMP. AMPL.
DEMOD.

FIGURE 5. TRACKER FUNCTIONAL TESTER TIE–IN

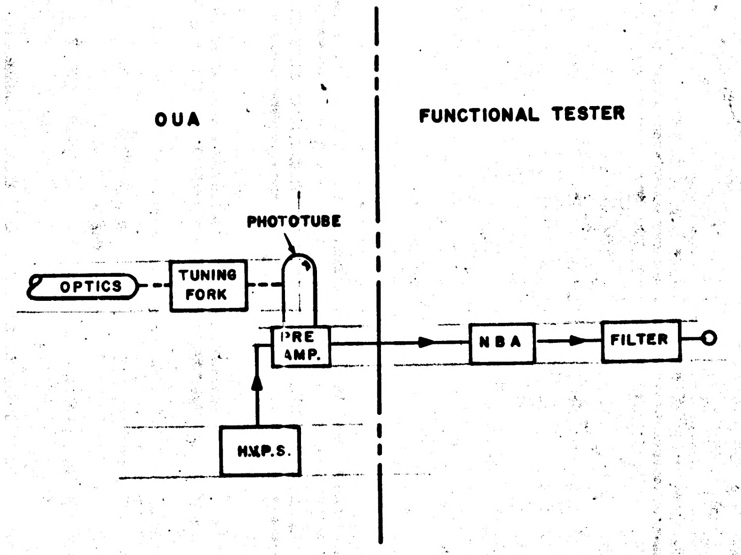
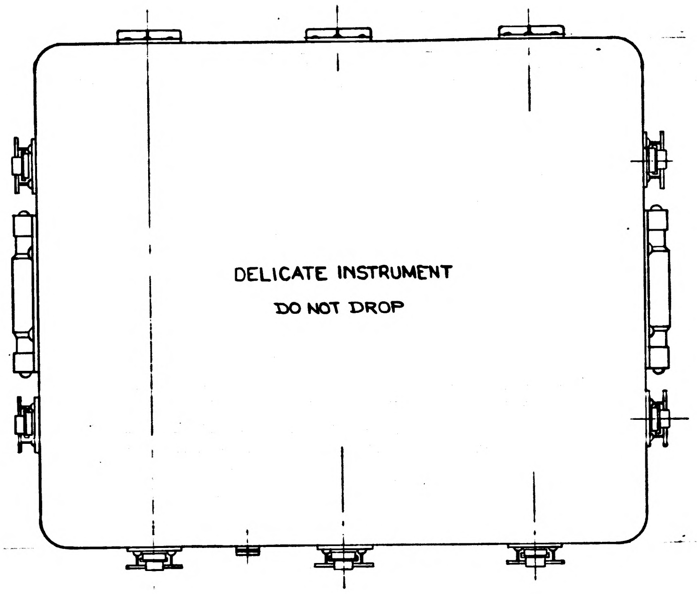

OUA
FUNCTIONAL TESTER
PHOTOTUBE
OPTICS
TUNING FORK
PRE AMP.
NBA
FILTER
HVP.S.

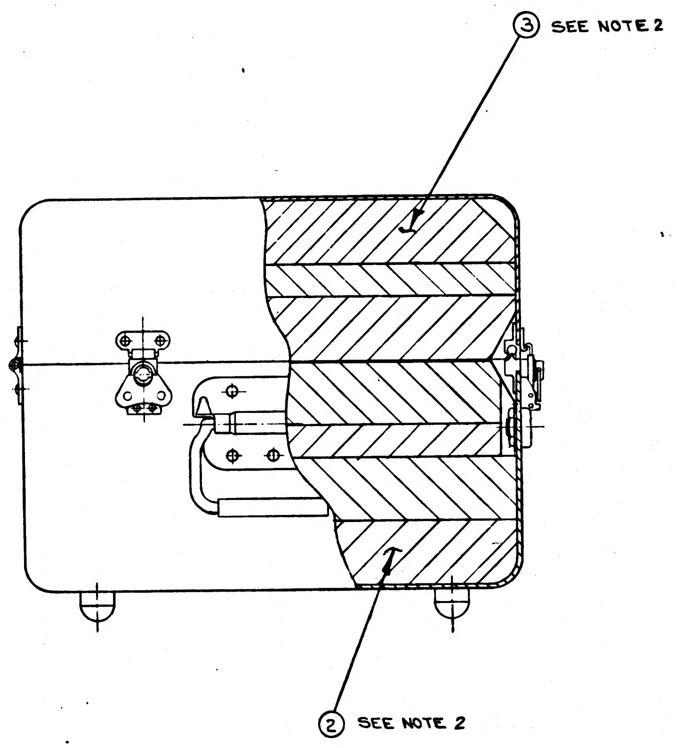
FIGURE 6. PHOTOMETER–FUNCTIONAL TESTER TIE–IN

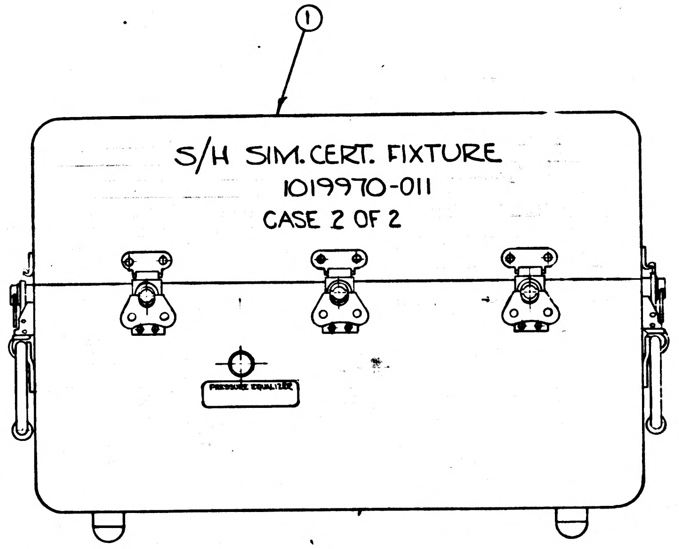
REVISIONS - DAR 1986C				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. -INTERPRET DRAWING PER MIL-D-70327

2.-CEMENT ITEMS 2 AND 3 TO ITEM 1 WITH EC-1357 PER MIL-A-9067
3.-IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND 1002019 (TAGGED)


DELICATE INSTRUMENT
DO NOT DROP


③ SEE NOTE 2
② SEE NOTE 2


①
S/H SIM. CERT. FIXTURE
1019970-011
CASE 2 OF 2
PRESSURE EQUALIZER

ITEM NO.	QTY REQD -011	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		1019895-011	02386910170		PAD, CUSHION ASSY, UPPER			
2	1		1019893-011	02386910168		PAD, CUSHION ASSY, LOWER			
1	1		1001764-011	02386910166		CASE, STORAGE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019896	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910169
DRAWN T. CARDILE DATE 2-18-65
CHECKED B. [illegible] 3-4-65
APPROVAL [illegible] 3-15-65
APPROVAL
NASA APPROVAL C. C. [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

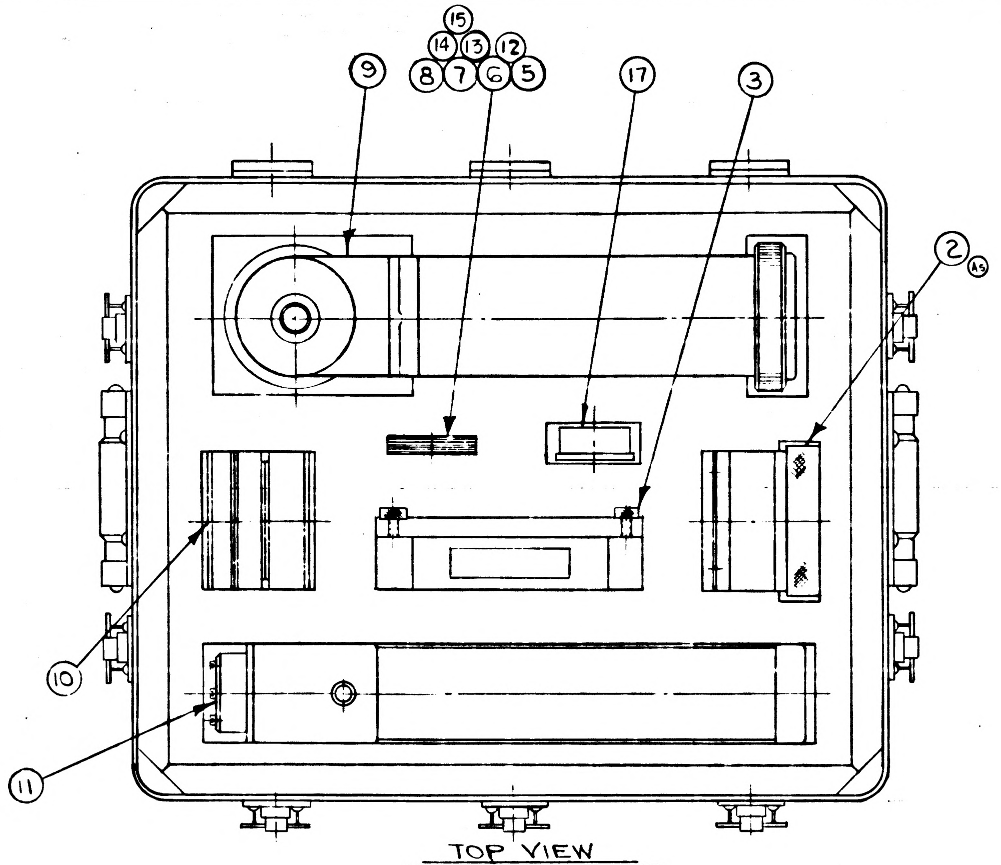
TITLE CASE, STORAGE ASSY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019894
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

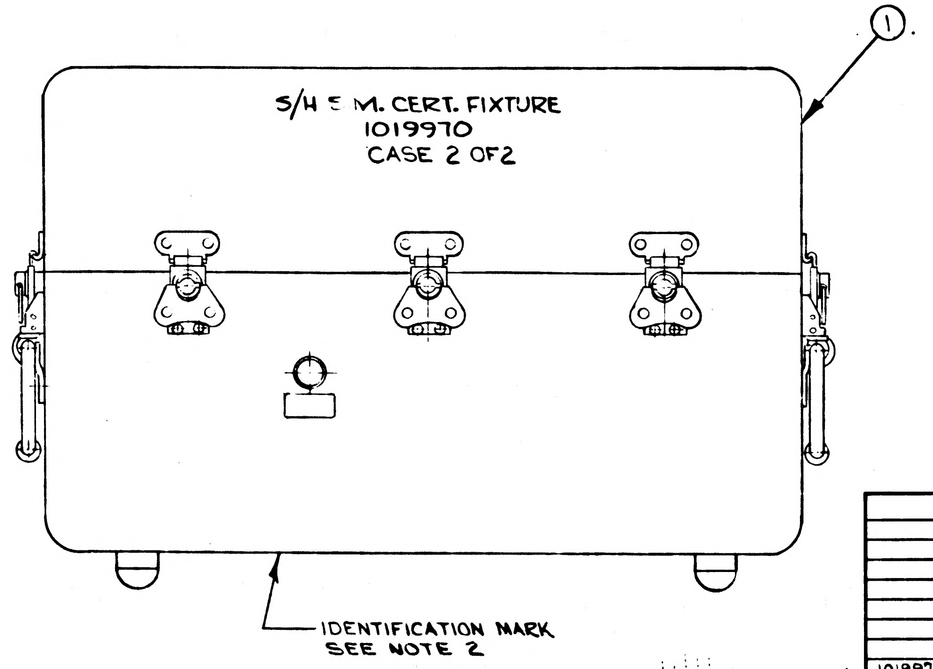
MASTER

NOTES
1. -INTERFRET DRAWING PER MIL-D-70327
2. -IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND 100 2019 (UNDER SIDE OF CASE)

REVISIONS TDRR 17500				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A6		REVISED PER ECP 112095 TDRR 20209 DATE 7-2-65	7-2-65 ASA	7-14-65 M.S.
B5		REVISED PER ECO 111332 TDRR 20928 DATE 7-29-65	7-29-65	UM 7-29-65
C1		REVISED PER ECO 111998 TDRR 21160 DATE 7-29-65	7-29-65	[illegible]



TOP VIEW
WITH COVER REMOVED



	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
C1	17	1		1022957-011	02386910502		ADAPTER FILTER ASSY			
B5	16	1		1019544-5	03386911591		LIGHT, STOP			
A4	15	1		1022486	03386911540		MASK, SYMETRICAL ATTENUATING			
A3	14	1		1022485	03386911539		MASK, SYMETRICAL ATTENUATING			
A2	13	1		1022484	03386911538		MASK, SYMETRICAL ATTENUATING			
A6	12	1		1022147	03386910160		LIGHT, STOP			
	11	1		1019945-011	17700004242		STAR CALIBRATION UNIT			
	10	1		1019949-011	17700004268		CALIBRATION, ADAPTER MOUNT			
	9	1		1019944-011	17700004270		NORMAL PROBE			
B4	8	1		1019544-4	03386911590		LIGHT, STOP			
B3	7	1		1019544-3	03386911589		LIGHT, STOP			
B2	6	1		1019544-2	03386911588		LIGHT, STOP			
B1	5	1		1019544-1	03386911587		LIGHT, STOP			
A	4	1								
	3	1		1001767	03386910217		MIRROR, REFERENCE			
	2	1		1019950	17700004228		BACKGROUND, REFERENCE			
	1	1		1019894-011	02386910169		CASE, STORAGE ASSY			
		-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
1019970	1019970
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910180
DRAWN J. CARDILE DATE 2-19-65
CHECKED B. WERTENTEL 3-11-65
APPROVAL [illegible]
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

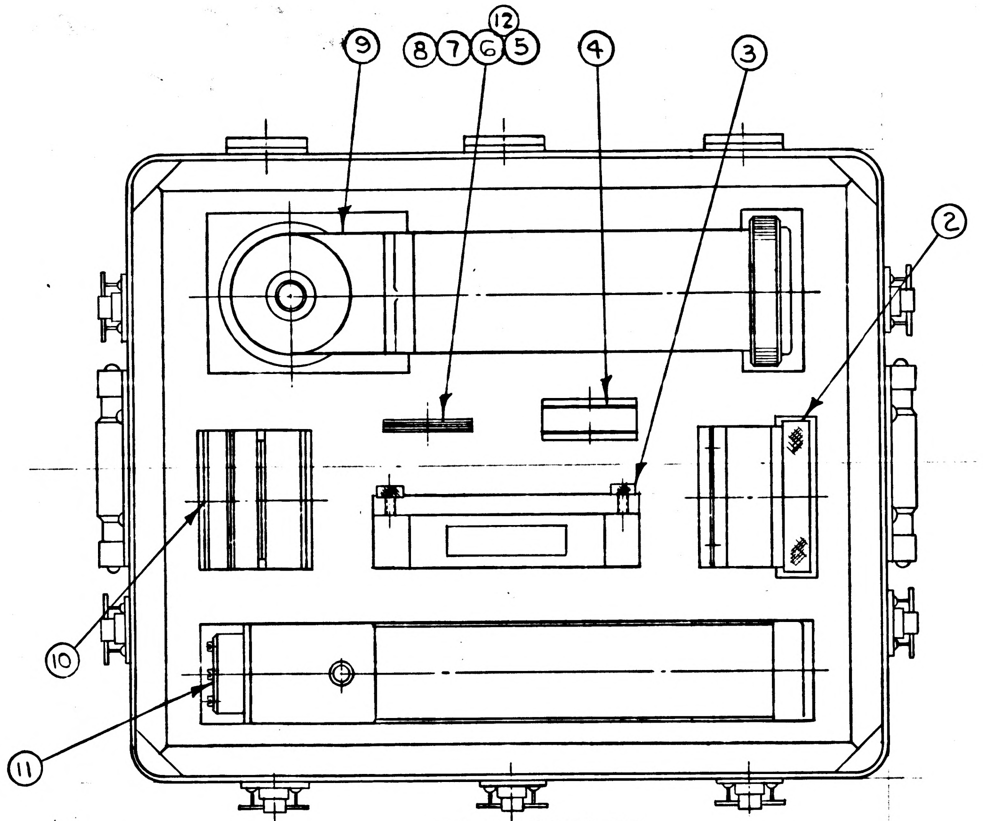
TITLE
S/H SIMULATOR
CERTIFICATION ASSY.

CODE IDENT NO. 89944 SIZE D NASA NUMBER 1019896
SCALE 1:2 WEIGHT CALC ACTUAL SHEET 1 OF 1

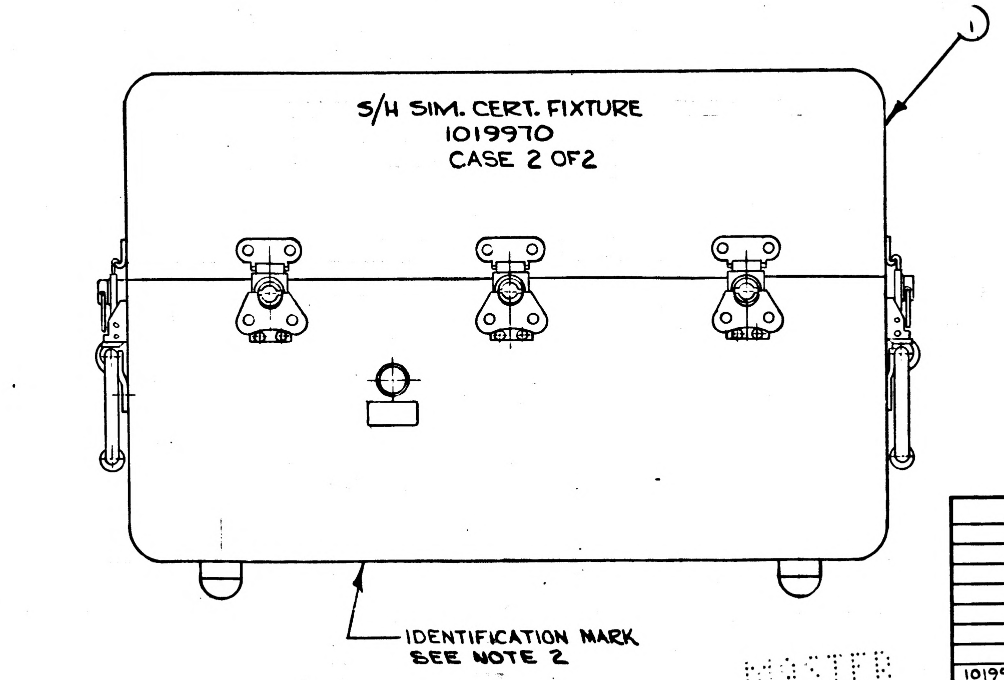
1019896

REVISIONS TDRR 1730				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. - INTERPRET DRAWING PER MIL-D-70327
2. - IDENTIFY USING NASA DRAWING NO., REV LETTER AND MANUFACTURER'S SYM PER ND 100 2019 (UNDER SIDE OF CASE)



TOP VIEW
WITH COVER REMOVED



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
12	1		1022147	03386910160		STOP, LIGHT			
11	1	✓	1019945-011	17700004242		STAR CALIBRATION UNIT			
10	1	✓	1019949-011	17700004268		CALIBRATION, ADAPTER MOUNT			
9	1	✓	1019944-011	17700004270		NORMAL PROBE			
8	1		1019544-4	170000010527		LIGHT, STOP			
7	1		1019544-3	170000010526		LIGHT, STOP			
6	1		1019544-2	170000010525		LIGHT, STOP			
5	1		1019544-1	170000010524		LIGHT, STOP			
4	1	✓	1019892-011	02386910167		FILTER, HOUSING ASSY			
3	1	✓	1001767	03386910217		MIRROR, REFERENCE			
2	1	✓	1019950	17700004228		BACKGROUND, REFERENCE			
1	1		1019894-011	02386910169		CASE, STORAGE ASSY			
	-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	1019970
USED ON	1019970
	APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910180
DRAWN J. CARDILE DATE 2-19-65
CHECKED B. WERTENTEL 3-11-65
APPROVAL [illegible] 3-11-65
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 4-[illegible]-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
S/H SIMULATOR
CERTIFICATION ASSY.

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019896
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

WA

AD-1380

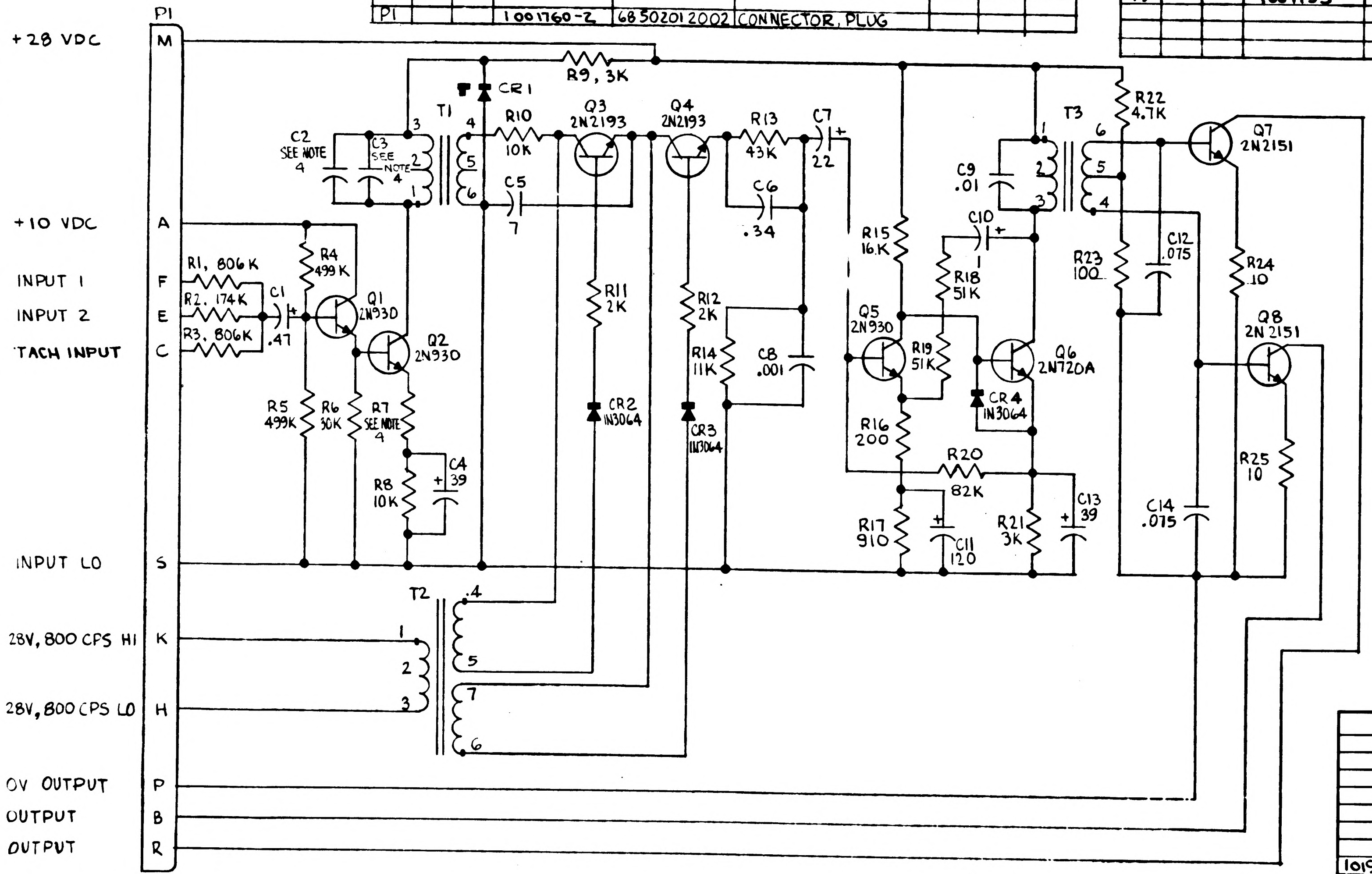
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. PARTS LIST TO BE FOR REFERENCE ONLY
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS.
4. VALUES TO BE DETERMINED BY TEST SEE CHART

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1001706-65		CAPACITOR	.47	±10%	35V
C2			1001722 SEE NOTE 4		↑		±10%	200V
C3			1001704 - SEE NOTE 4				±10%	100V
C4			1001706-13			39	±10%	10V
C5			1001717-102			7	±10%	6V
C6			1001723-226			.34	±10%	35V
C7			1001706-29			2.2	±10%	20V
C8			1001722-17			.001	±10%	200V
C9			1001704-124			.01	±10%	300V
C10			1001706-69			1	±10%	35V
C11			1001706-15			120	±10%	10V
C12			1001723-218			.075	±10%	35V
C13			1001706-13		↓	39	±10%	10V
C14			1001723-218		CAPACITOR	.075	±10%	35V
CR1			1001749-24		DIODE			
CR2			1001708		DIODE (1N3064)			
CR3			1001708		DIODE (1N3064)			
CR4			1001708		DIODE (1N3064)			
Q1			1001720-001		TRANSISTOR (2N930)			
Q2			1001720-001		↑ (2N930)			
Q3			1001719-001		(2N2193A)			
Q4			1001719-001		(2N2193A)			
Q5			1001720-001		(2N930)			
Q6			1001712-1		(2N720A)			
Q7			1001802-002		↓ (2N2151)			
Q8					TRANSISTOR (2N2151)			
P1			1001760-2	6850201 2002	CONNECTOR, PLUG			

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
R1			1001715-20		RESISTOR	806K	±1%	1/8 W
R2			1001705-681		↑	174K	±1%	1/8 W
R3			1001715-20			806K	±1%	1/8 W
R4			1001705-769			499K	±1%	1/8 W
R5			1001705-769			499K	±1%	1/8 W
R6			1001713-67			30K	±2%	1/4 W
R7			1001713-			SEE NOTE 4	↑	
R8			1001713-56			10K		1/4W
R9			1001713-43			3K		↑
R10			1001713-56			10K		
R11			1001713-39			2K		
R12			1001713-39			2K		
R13			1001713-71			43K		
R14			1001713-57			11K		
R15			1001713-61			16K		
R16			1001713-15			200		
R17			1001713-31			910		
R18			1001713-73			51K		
R19			1001713-73			51K		
R20			1001713-78			82K		↓
R21			1001713-43			3K		1/4 W
R22			1001716-48			4.7K	↓	1/2 W
R23			1001713-8			100	±2%	1/4 W
R24			1001714-8		↓	10	±1%	3W
R25			1001714-8		RESISTOR	10	±1%	3W
T1			1001733		TRANSFORMER			
T2			1001718		TRANSFORMER			
T3			1001733		TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	—	CLASS A RELEASE PER TDRR 21713		
A_5		REVISED PER ECO 109422 TDRR 23964 DATE 11-9-65	11-19-65 M.S.	[illegible] 12-[illegible]-65


P1
+28 VDC
M
+10 VDC
A
INPUT 1
F
INPUT 2
E
TACH INPUT
C
INPUT LO
S
28V, 800 CPS HI
K
28V, 800 CPS LO
H
OV OUTPUT
P
OUTPUT
B
OUTPUT
R
R1, 806K
R2, 174K
R3, 806K
C1
.47
R4
499K
Q1
2N930
Q2
2N930
R5
499K
R6
30K
R7
SEE NOTE 4
R8
10K
C4
39
C2
SEE NOTE 4
C3
SEE NOTE 4
T1
3
2
1
4
5
6
CR1
R9, 3K
R10
10K
C5
7
Q3
2N2193
Q4
2N2193
R11
2K
R12
2K
CR2
1N3064
CR3
1N3064
R13
43K
C6
.34
C7
22
R14
11K
C8
.001
T2
1
2
3
4
5
7
6
R15
16K
Q5
2N930
R16
200
R17
910
C11
120
R18
51K
R19
51K
C10
1
Q6
2N720A
CR4
1N3064
R20
82K
R21
3K
C13
39
C9
.01
T3
1
2
3
6
5
4
R22
4.7K
R23
100
C12
.075
Q7
2N2151
R24
10
Q8
2N 2151
R25
10
C14
.075

SELECTION CHARTS

C2

PART NO.	VALUE
1001722-17	1000 UUF
1001722-21	2200UUF
1001722-23	3300UUF
1001722-25	4700UUF
1001722-26	5600UUF
1001722-27	6800 UUF
1001722-28	8200 UUF
1001722-29	10000 UUF

R7

PART NO.	VALUE
1001713-4	68
1001713-5	75
1001713-6	82
1001713-7	91
1001713-8	100
1001713-9	110
1001713-10	120
1001713-11	130
1001713-12	150
1001713-13	.60
1001713-1	51
1001713-2	56
1001716-109	33
1001716-111	39
1001716-113	47

C3

PART NO.	VALUE
1001704-52	.015 UF
1001704-53	.018 UF

REFERENCE DWG'S
AMPLIFIER, MOTOR DRIVE ASSY 1019880-011

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019880	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910072
DRAWN J.D DUNN DATE 3-5-65
CHECKED Emil D. [illegible] 3-24-65
APPROVAL [illegible] 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019898
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF

1019898

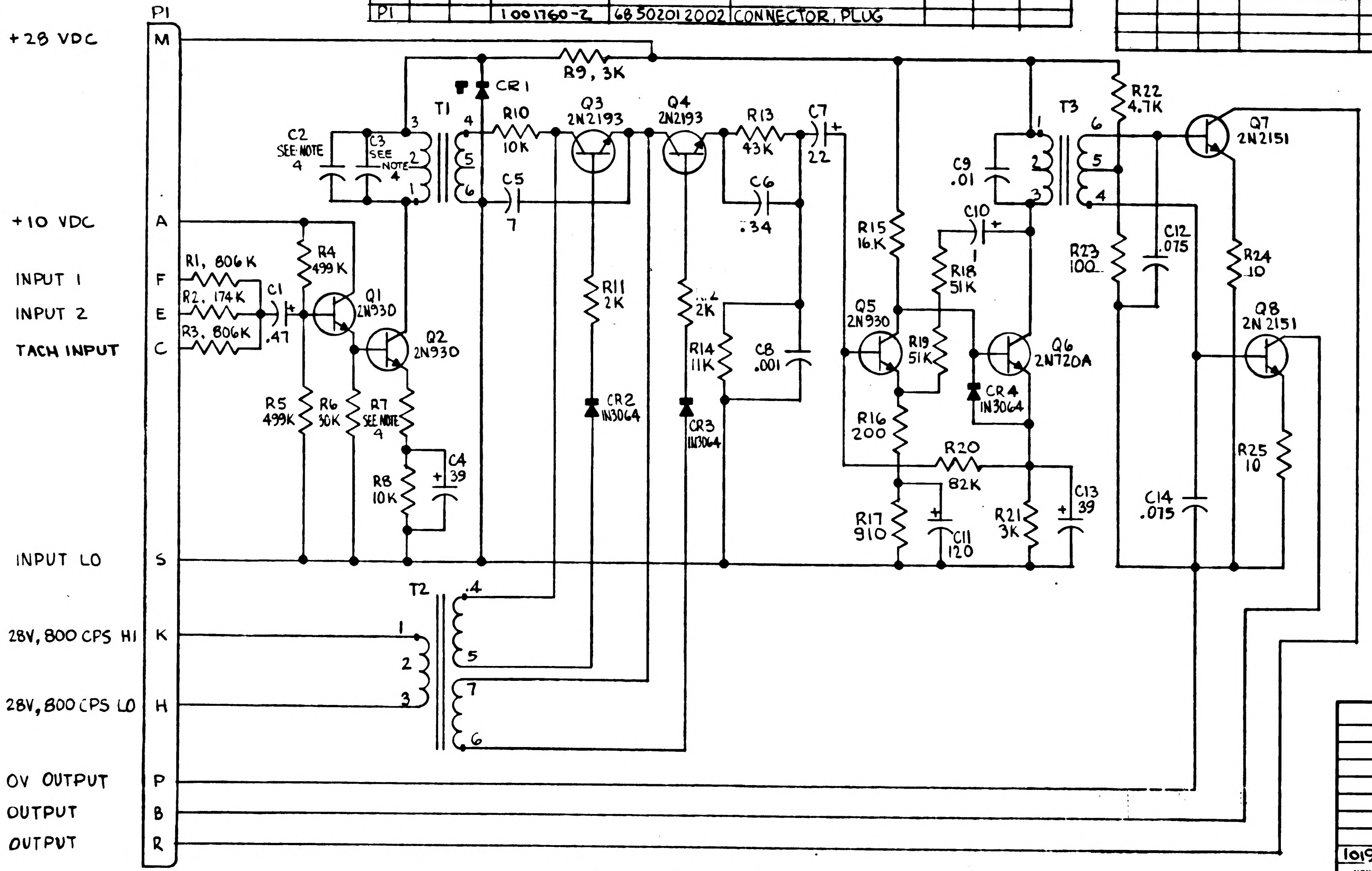
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. PARTS LIST TO BE FOR REFERENCE ONLY
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS.
4. VALUES TO BE DETERMINED BY TEST SEE CHART

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1001706-65		CAPACITOR	.47	±10%	35V
C2			1001722 SEE NOTE 4				±10%	200V
C3			1001704 - SEE NOTE 4				±10%	100V
C4			1001706-13			39	±10%	10V
C5			1001717-102			7	±10%	6V
C6			1001723-226			.34	±10%	35V
C7			1001706-29			2.2	±10%	20V
C8			1001722-17			.001	±10%	200V
C9			1001704-124			.01	±10%	300V
C10			1001706-69			1	±10%	35V
C11			1001706-15			120	±10%	10V
C12			1001723-218			.075	±10%	35V
C13			1001706-13			39	±10%	10V
C14			1001723-218		CAPACITOR	.075	±10%	35V
CR1			1001749-24		DIODE			
CR2			1001708		DIODE (1N3064)			
CR3			1001708		DIODE (1N3064)			
CR4			1001708		DIODE (1N3064)			
Q1			1001720-001		TRANSISTOR (2N930)			
Q2			1001720-001		(2N930)			
Q3			1001719-001		(2N2193A)			
Q4			1001719-001		(2N2193A)			
Q5			1001720-001		(2N930)			
Q6			1001712-1		(2N720A)			
Q7			1001802-002		(2N2151)			
Q8					TRANSISTOR (2N2151)			
P1			1001760-2	68 5020120 02	CONNECTOR, PLUG			

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
R1			1001715-20		RESISTOR	806K	±1%	1/8 W
R2			1001705-681			174K	±1%	1/8 W
R3			1001715-20			806K	±1%	1/8 W
R4			1001705-769			499K	±1%	1/8 W
R5			1001705-769			499K	±1%	1/8 W
R6			1001713-67			30K	±2%	1/4 W
R7			1001713-			SEE NOTE 4		
R8			1001713-56			10K		1/4W
R9			1001713-43			3K		
R10			1001713-56			10K		
R11			1001713-39			2K		
R12			1001713-39			2K		
R13			1001713-71			43K		
R14			1001713-57			11K		
R15			1001713-61			16K		
R16			1001713-15			200		
R17			1001713-31			910		
R18			1001713-73			51K		
R19			1001713-73			51K		
R20			1001713-78			82K		
R21			1001713-43			3K		1/4 W
R22			1001716-48			4.7K		1/2 W
R23			1001713-8			100	±2%	1/4 W
R24			1001714-8			10	±1%	3W
R25			1001714-8		RESISTOR	10	±1%	3W
T1			1001733		TRANSFORMER			
T2			1001718		TRANSFORMER			
T3			1001733		TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	—	CLASS A RELEASE PER TDRR 21713		
A5		REVISED PER ECO 109422 TDRR 23964 DATE 11-9-65	11-19-65 M.S.	H. DEAN 12-2-65
B		REVISED PER ECO 114419 TDRR 25642 DATE 1-25-66	3-1-66 gm	HDB 3-2-66


P1
+28 VDC
M
+10 VDC
A
INPUT 1
F
INPUT 2
E
TACH INPUT
C
INPUT LO
S
28V, 800 CPS HI
K
28V, 800 CPS LO
H
OV OUTPUT
P
OUTPUT
B
OUTPUT
R
R9, 3K
CR1
T1
R10
10K
Q3
2N2193
Q4
2N2193
R13
43K
C7
2.2
C2
SEE NOTE 4
C3
SEE NOTE 4
C5
7
C6
.34
R1, 806K
R2, 174K
R3, 806K
C1
.47
R4
499K
Q1
2N930
Q2
2N930
R5
499K
R6
30K
R7
SEE NOTE 4
R8
10K
C4
39
R11
2K
CR2
1N3064
R12
2K
CR3
1N3064
R14
11K
C8
.001
T2
C9
.01
C10
1
R15
16K
R18
51K
Q5
2N930
R19
51K
Q6
2N720A
CR4
1N3064
R16
200
R20
82K
R17
910
C11
120
R21
3K
C13
39
T3
R22
4.7K
Q7
2N2151
R23
100
C12
.075
R24
10
Q8
2N2151
R25
10
C14
.075

SELECTION CHARTS

C2

PART NO.	VALUE
1001722-17	1000 UUF
1001722-21	2200 UUF
1001722-23	3300 UUF
1001722-25	4700 UUF
1001722-26	5600 UUF
1001722-27	6800 UUF
1001722-28	8200 UUF
1001722-29	10000 UUF
1001722-9	220 UUF
1001722-13	470 UUF
1001722-1	47 UUF
1001722-3	68 UUF
1001722-4	82 UUF
1001722-5	100 UUF

R7

PART NO.	VALUE
1001713-4	68
1001713-5	75
1001713-6	82
1001713-7	91
1001713-8	100
1001713-9	110
1001713-10	120
1001713-11	130
1001713-12	150
1001713-13	160
1001713-1	51
1001713-2	56
1001716-109	33
1001716-111	39
1001716-113	47

C3

PART NO.	VALUE
1001704-52	.015 UF
1001704-53	.018 UF

REFERENCE DWG'S
1. AMPLIFIER, MOTOR DRIVE ASSY 1019880-011
2. AMPLIFIER, MOTOR DRIVE ASSY 1019880-021

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019880	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0238691 0072
DRAWN J.D. DUNN DATE 3-5-65
CHECKED Earl E. Moore 3-24-65
APPROVAL Wilkinson 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AMPLIFIER, MOTOR DRIVE
SCHEMATIC DIAGRAM

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019898
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

1019898

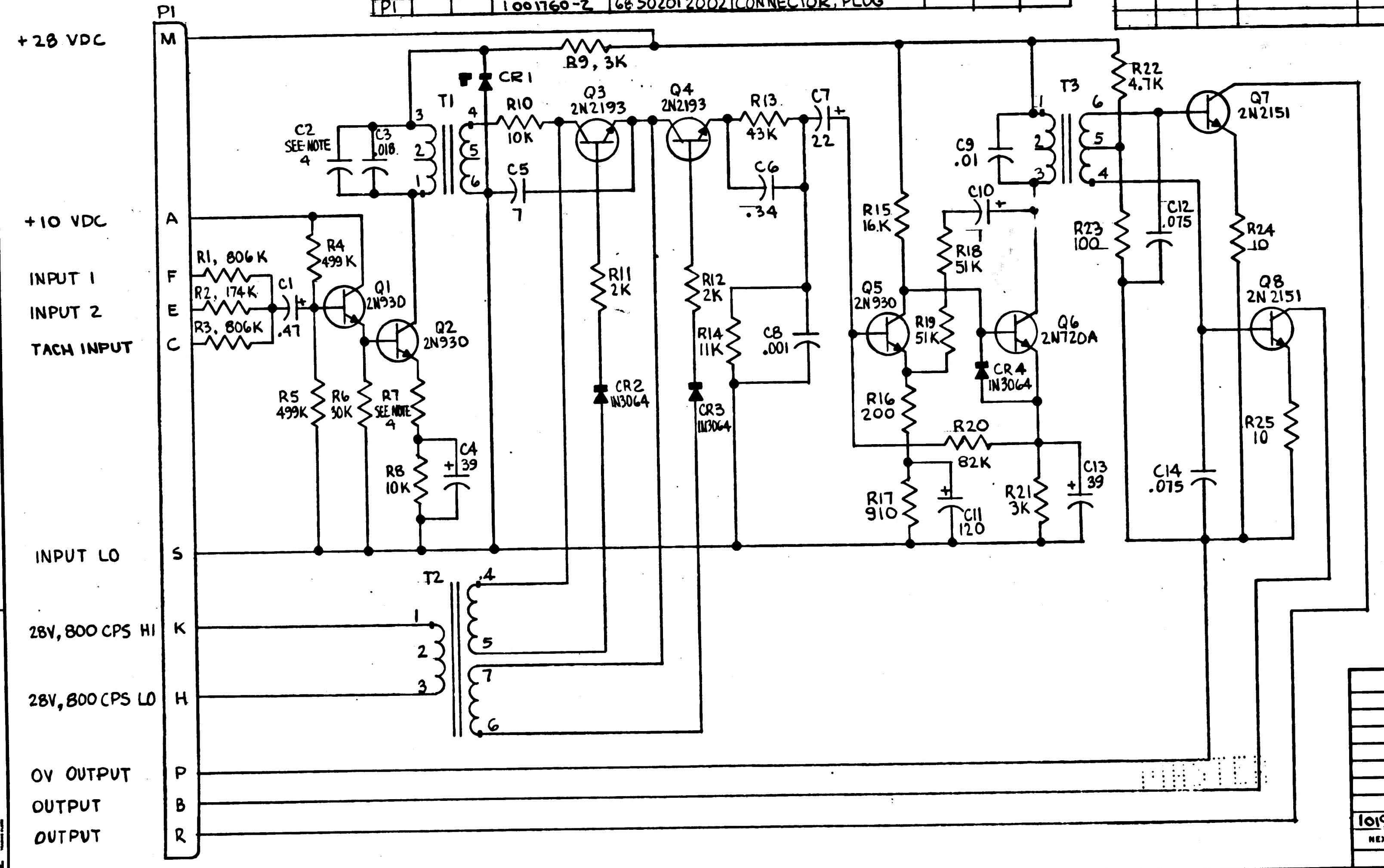
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. PARTS LIST TO BE FOR REFERENCE ONLY
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS.
4. VALUES TO BE DETERMINED BY TEST SEE CHART

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
C1			1001706-65		CAPACITOR	.47	±10%	35V
C2			1001722 SEE	NOTE 4			±10%	200V
C3			1001704-53			.018	±10%	100V
C4			1001706-13	—		39	±10%	10V
C5			1001717-102			7	±10%	6V
C6			1001723-226			.34	±10%	35V
C7			1001706-29			2.2	±10%	20V
C8			1001722-17			.001	±10%	200V
C9			1001704-124			.01	±10%	300V
C10			1001706-69			1	±10%	35V
C11			1001706-15			120	±10%	10V
C12			1001723-218			.075	±10%	35V
C13			1001706-13			59	±10%	10V
C14			1001723-218	—	CAPACITOR	.075	±10%	35V
CR1			1001749-24		DIODE			
CR2			1001708		DIODE (IN3064)			
CR3			1001708		DIODE (IN3064)			
CR4			1001708		DIODE (IN3064)			
Q1			1001720-001		TRANSISTOR (2N930)			
Q2			1001720-001		(2N930)			
Q3			1001719-001		(2N2193A)			
Q4			1001719-001		(2N2193A)			
Q5			1001720-001		(2N930)			
Q6			1001712-1		(2N720A)			
Q7			1001802-002		(2N2151)			
Q8					TRANSISTOR (2N2151)			
P1			1001760-2	68 50201 2002	CONNECTOR, PLUG			

REF DESIG	ZONE	SYM	GOVERNMENT OR NASA NO.	KOLLSMAN NO.	DESCRIPTION	VALUE	TOL	RATING
R1			1001715-20		RESISTOR	806K	±1%	1/8 W
R2			1001705-681			174K	±1%	1/8 W
R3			1001715-20			806K	±1%	1/8 W
R4			1001705-769			499K	±1%	1/8 W
R5			1001705-769			499K	±1%	1/8 W
R6			1001713-67			30K	±2%	1/4 W
R7			1001713-			SEE NOTE 4		
R8			1001713-56			10K		
R9			1001713-43			3K		
R10			1001713-56			10K		
R11			1001713-39			2K		
R12			1001713-39			2K		
R13			1001713-71			43K		
R14			1001713-57			11K		
R15			1001713-61			16K		
R16			1001713-15			200		
R17			1001713-31			910		
R18			1001713-73			51K		
R19			1001713-73			51K		
R20			1001713-78			82K		
R21			1001713-43			3K		1/4 W
R22			1001716-48			4.7K		1/2 W
R23			1001713-8			100	±2%	1/4 W
R24			1001714-8			10	±1%	3W
R25			1001714-8		RESISTOR	10	±1%	3W
T1			1001733		TRANSFORMER			
T2			1001718		TRANSFORMER			
T3			1001733		TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	—	CLASS A RELEASE PER TDRR 21713		


P1
+28 VDC
M
+10 VDC
A
INPUT 1
F
INPUT 2
E
TACH INPUT
C
INPUT LO
S
28V, 800 CPS HI
K
28V, 800 CPS LO
H
OV OUTPUT
P
OUTPUT
B
OUTPUT
R
R1, 806K
R2, 174K
R3, 806K
C1 .47
R4 499K
Q1 2N930
Q2 2N930
R5 499K
R6 30K
R7 SEE NOTE 4
R8 10K
C4 39
C2 SEE NOTE 4
C3 .018
T1
CR1
R9, 3K
R10 10K
C5 7
Q3 2N2193
Q4 2N2193
R11 2K
R12 2K
CR2 1N3064
CR3 1N3064
R13 43K
C7 2.2
C6 .34
R14 11K
C8 .001
T2
C9 .01
C10 1
T3
R15 16K
R18 51K
Q5 2N930
R19 51K
Q6 2N720A
CR4 1N3064
R16 200
R20 82K
R17 910
C11 120
R21 3K
C13 39
R22 4.7K
Q7 2N2151
R23 100
C12 .075
R24 10
Q8 2N2151
R25 10
C14 .075

SELECTION CHARTS

C2

PART NO.	VALUE
1001722-17	1000 UUF
1001722-21	2200 UUF
1001722-23	3300 UUF
1001722-25	4700 UUF
1001722-26	5600 UUF
1001722-27	6800 UUF
1001722-28	8200 UUF
1001722-29	10000 UUF

R7

PART NO.	VALUE
1001713-4	68
1001713-5	75
1001713-6	82
1001713-7	91
1001713-8	100
1001713-9	110
1001713-10	120
1001713-11	130
1001713-12	150
1001713-13	160

REFERENCE DWGS
AMPLIFIER, MOTOR DRIVE ASSY 1019880-011

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019880	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910072
DRAWN J.D. DUNN DATE 3-5-65
CHECKED 3-24-65
APPROVAL 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE AMPLIFIER, MOTOR DRIVE SCHEMATIC DIAGRAM

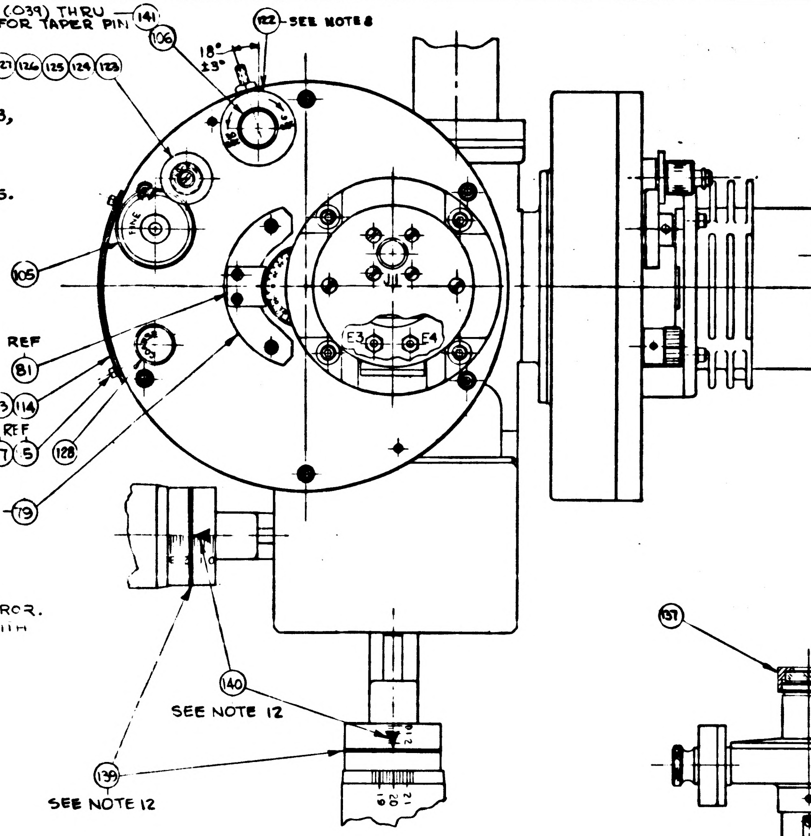
CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019898
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019898

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR 21729		
A2		REVISED PER ECO 109398 TDRR 23677 DATE 11-2-65	HEB 11-9-65	

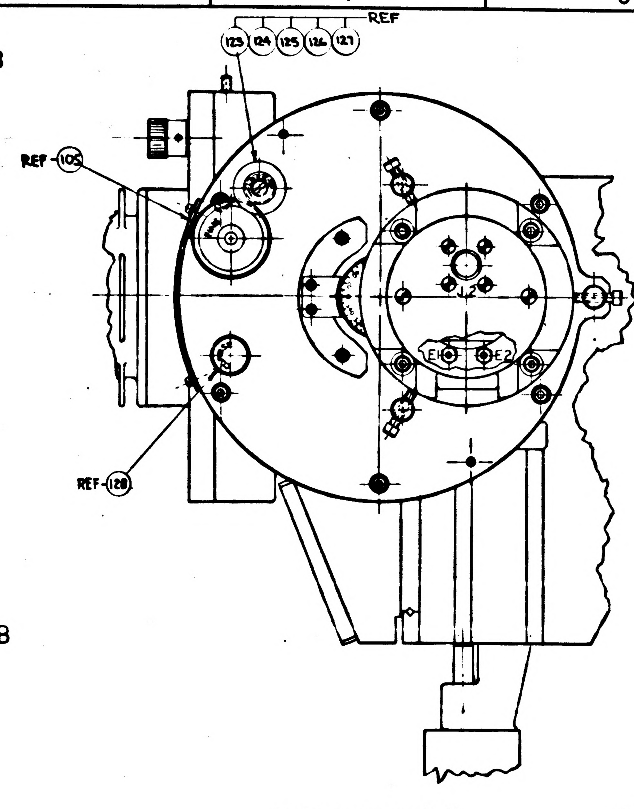
NOTES:

1. INTERPRET DWG PER MIL-D-70327.
2. ALL SCREWS NOT SECURED WITH LOCKWASHERS OR SELF-LOCKING NUTS TO BE SECURED WITH LOCTITE PER MIL-S-22473, GRADE HV PER ND1002211.
3. Δ ITEMS 26,37,42,61 AND 90 TO BE BLACKENED PER MIL-C-13924, CLASS 3.
4. ITEMS 117,118 AND 119 ARE SUPPLIED AS ACCESSORIES.
5. MACHINE ITEM 39 TO ALIGN STAR WITH HORIZON OPTICAL AXIS.
6. MACHINE ITEM 100 TO OBTAIN MAXIMUM ILLUMINATION AS SPECIFIED IN PS 1019977
7. FOR SHIPPING AND STORAGE INSTALL THIS UNIT IN CARRYING CASE 1019957 (REF).
8. CEMENT ITEM NO. 122 TO ITEM NO. 55 USING ADHESIVE PER MIL-A-5092, TYPE III AS SPECIFIED IN PS 1019977.
9. APPLY PLATE IDENTIFICATION PER ND1002219 & SERIALIZE PER N[illegible]23.
10. LOCATE MICROMETERS IN MID POSITION WITH STARS AND CSINK. FOR CONE POINT SET SCREWS 90°X.093 DIA.
11. ALIGN CLEAR AREA OF FILTER ASSY (ITEM 44) OVER CLEAR AREA OF FILTER ASSY (ITEM 6) AND ALIGN WITH 6 SECOND STAR IN CENTER.
12. MOVE SLIDES TO EXTREME POSITIONS WITH MICROMETER SCREWS BACK OFF TWO TURNS. AT THESE POSITIONS APPLY ITEMS 139 AND 140 TO MICROMETER BARREL AS SHOWN.
13. LAPPED SURFACE OF CLAMPING PLATE TO FACE MIRROR.
14. ALL GLASS TO BE ASSEMBLED IN ACCORDANCE WITH ND [illegible] UNLESS OTHERWISE SPECIFIED.



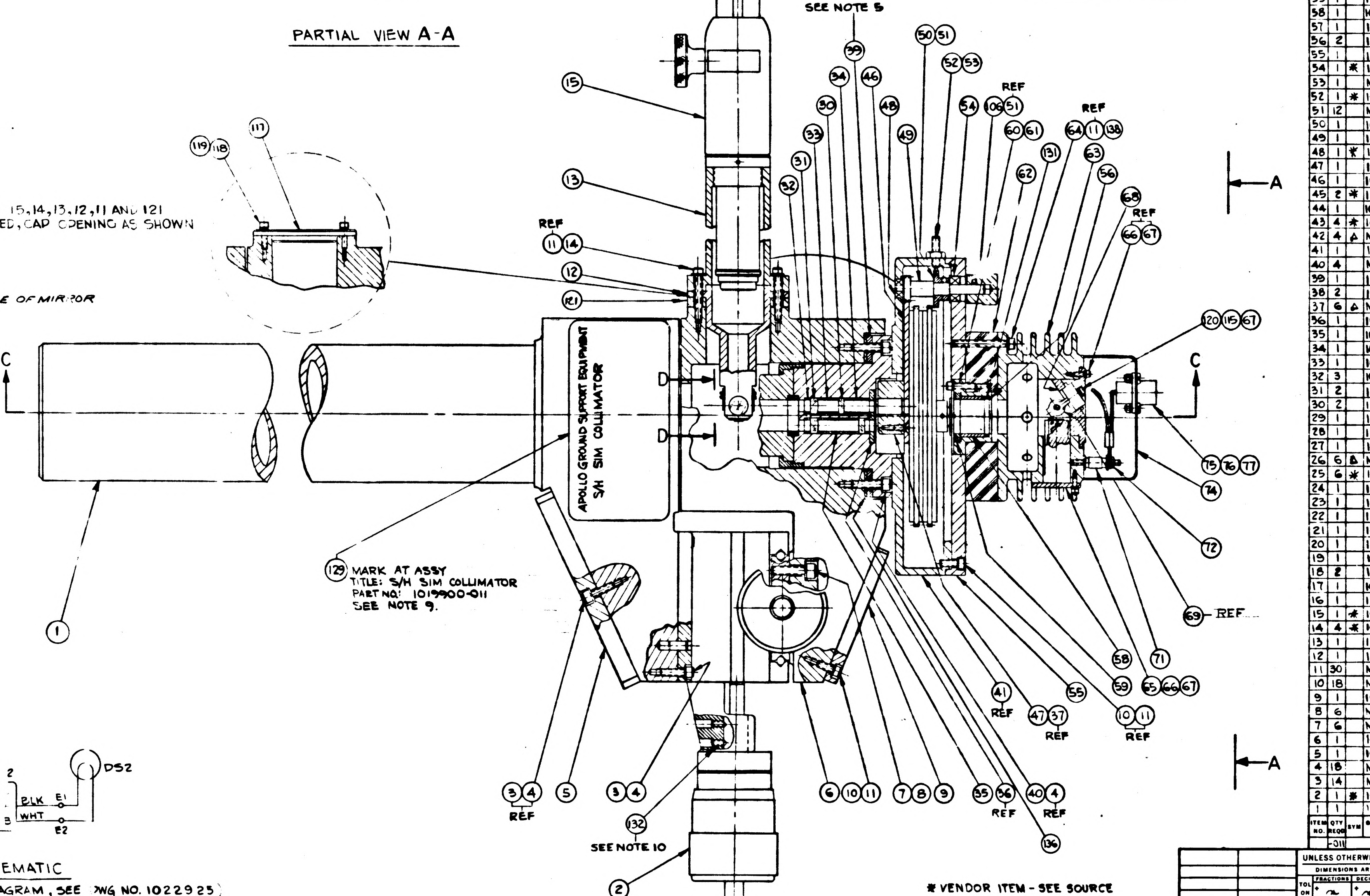
(A1) DR NO.61 (.039) THRU — REAM FOR TAPER PIN
141
106
122 — SEE NOTE 8
127 126 125 124 123
18° ±3°
105
REF 81
113 114
REF 67 5
128
REF 79
140
SEE NOTE 12
139
SEE NOTE 12
E3
E4

PARTIAL VIEW A-A

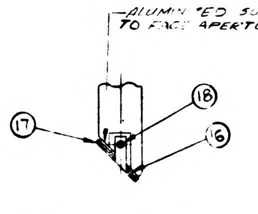


REF
123 124 125 126 127
REF 105
REF 128
E1
E2
B
B

PARTIAL VIEW B-B

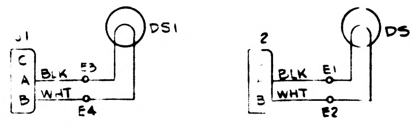


137
SEE NOTE 5
15
13
REF 11 14
12
121
119 118
117
WHEN ITEMS 15,14,13,12,11 AND 121 ARE NOT USED, CAP OPENING AS SHOWN
APOLLO GROUND SUPPORT EQUIPMENT
S/H SIM COLLIMATOR
C
C
D
D
A
A
1
129 MARK AT ASSY TITLE: S/H SIM COLLIMATOR PART NO: 1019900-011 SEE NOTE 9.
39
34 46
30 48
33 49
31
32
50 51
52 53
REF 54 106 51
60 61
REF 64 11 38
62
131
63
56
68
REF 66 67
120 115 67
75 76 77
74
72
69 — REF
58
59 65 66 67
71
10 11 REF
55
41 REF
47 37 REF
3 4 REF
5
3 4
32
SEE NOTE 10
2
6 10 11
7 8 9
35 36 REF
40 4 REF
136



ALUMINIZED SURFACE OF MIRROR TO FACE APERTURE
17
18
16

PARTIAL VIEW D-D



J1
C
A
B
BLK
WHT
E3
E4
DS1
2
BLK
WHT
E1
E2
DS2

WIRING SCHEMATIC

(FOR INTERCONNECTION DIAGRAM, SEE DWG NO. 1022925)

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT W
60	8	*	1017418-11			SCREW, CAP, SOC HD			
59	1		1022057	03386910813		RING, LOCKING			
58	1		1022058-002	03386911033		SPACER, APERTURE			
57	1		1022061	03386910780		GLASS, DIFFUSER			
56	2		1022056	03386910810		HOUSING, DIFFUSER			
55	1		1022041	03386910886		COVER, HOUSING			
54	1	*	1001728-16			BEARING, BALL			
53	1		MS35649-84	61501051008		NUT, PLAIN HEX			
52	1	*	1017432-15			PLUNGER, QUICK RELEASE (SCD)			
51	12		MS51029-1			SETSCREW, SOC, FLAT POINT			
50	1		1022181	03386910965		DETENT			
49	1		1022180	03386910964		GEARSHAFT, SPUR (24T, 48 DP)			
48	1	*	1001728-15			BEARING, BALL			
47	1		1022178	03386910966		BLOCK, LIGHT STOP			
46	1		1022179	03386910967		STOP, LIGHT			
45	2	*	1001810-001	03386910206		BEARING, BALL			
44	1		1019933-021	02386910261-2		GEAR AND HUB DENSITY FILTER ASSY			
43	4	*	1001728-17			BEARING, BALL			
42	4	Δ	MS35249-37	74455052037		SCREW, FLAT HD			
41	1		1022809-011	02386910285		HOUSING AND GEAR ASSY			
40	4		MS16995-27			SCREW, CAP, SOC HD			
39	1		1022171	03386910955		SHIM			
38	2		1022170	03386910951		SETSCREW			
37	6	Δ	MS35249-21	74455052021		SCREW, FLAT HD			
36	1		1019925-011	02386910253		PLATE AND PIN ASSY			
35	1		1022020-004	03386910872		SPACER, RELAY LENS			
34	1		1022020-003	03386910871		SPACER, RELAY LENS			
33	1		1022020-002	03386910870		SPACER, RELAY LENS			
32	3		1022020-001	03386910869		SPACER, RELAY LENS			
31	2		1022172	03386910516		LENS, RELAY			
30	2		1022031	03386910515		LENS, RELAY			
29	1		1022012	03386910861		RING, LOCKING			
28	1		1019924-011	02386910252		HOUSING AND PIN ASSY			
27	1		1022014	03386910863		SLEEVE, PILOT			
26	6	Δ	MS35337-77	74439050001		LOCKWASHER			
25	6	*	1017418-3			SCREW, CAP, SOC HD			
24	1		1022019	03386910868		PLATE, CLAMPING			
23	1		1022018	03386910867		PLATE, CLAMPING			
22	1		1022017	03386910866		PLATE, CLAMPING			
21	1		1022169	03386910953		WASHER, WAVE			
20	1		1022030	03386910540		MIRROR			
19	1		1019923-011	02386910251		MIRROR MOUNT AND PIN ASSY			
18	2		1022461-001	61401060006		SCREW, FLAT FIL HD			
17	1		1022000	03386910429		CLAMP, MIRROR			
16	1		1022168	03386910962		MIRROR, MICROSCOPE			
15	1	*	1001776	02386910249		FILAR MICROMETER MICROSCOPE (SCD)			
14	4	*	1017418-34			SCREW, CAP, SOC HD			
13	1		1022001	03386910854		ADAPTER, MICROSCOPE			
12	1		1019922-011	02386910248		MIRROR MOUNT AND PIN ASSY			
11	30		MS35337-79	74439050003		LOCKWASHER			
10	18		MS16995-17			SCREW, CAP, SOC HD			
9	1		1022167	03386911000		PLATE			
8	6		MS35337-81	74439050005		LOCKWASHER			
7	6		MS16996-12			SCREW, CAP, SOC HD			
6	1		1022808-011	02386910288		BRACKET AND PIN ASSY			
5	1		1022166	03386910954		PLATE			
4	18		MS35337-80	74439050004		LOCKWASHER			
3	14		MS16995-26			SCREW, CAP, SOC HD			
2	1	*	1022937	02386910431		MICROPOSITIONER (SCD)			
1	1		1022807-011	02386910292		HOUSING AND PIN ASSY			
	-011	LIST OF PARTS AND MATERIALS							

1019977	1019977
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

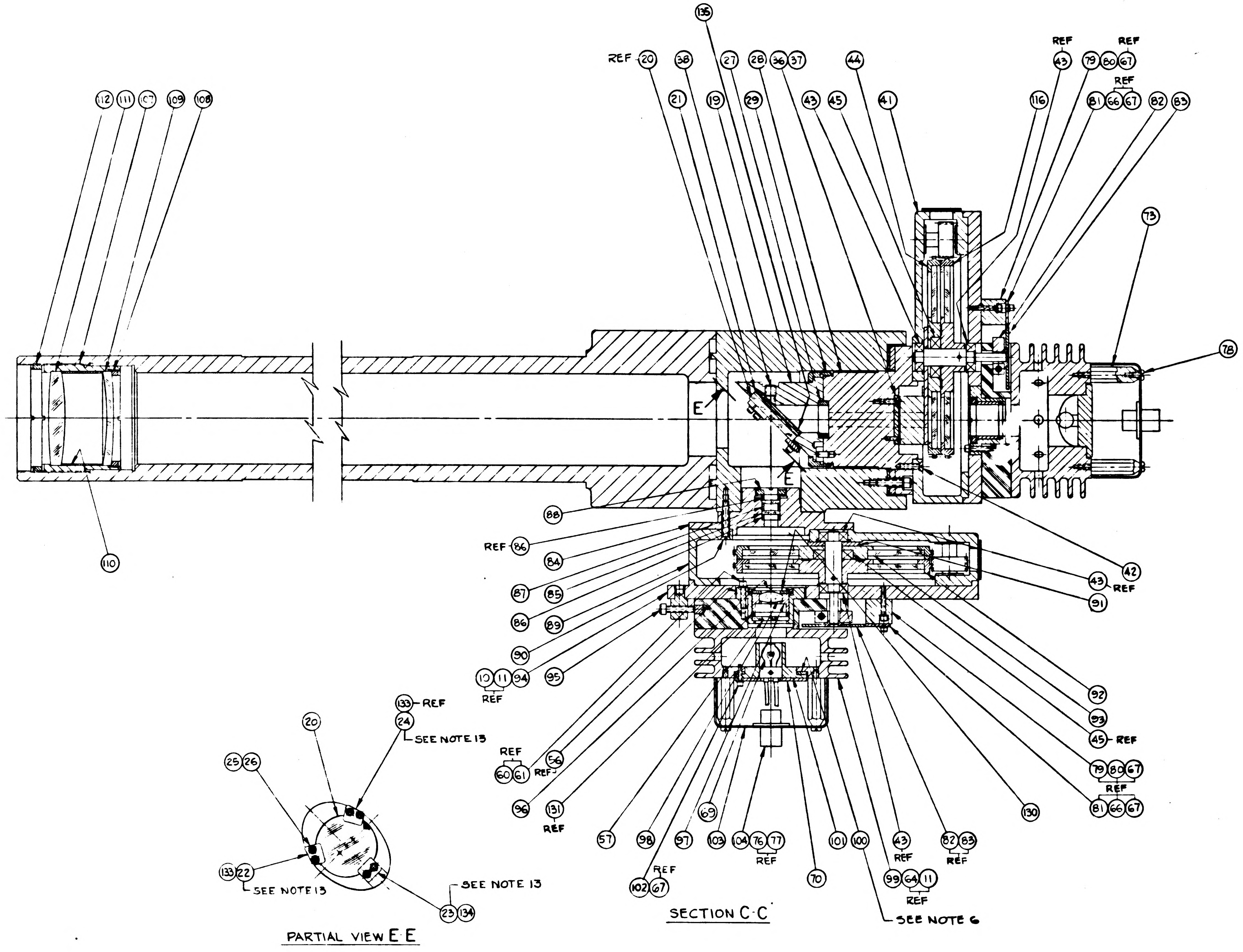
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910012
DRAWN AJ PERALTA DATE 4-8-65
CHECKED 4-30-65
APPROVAL 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON SIMULATOR COLLIMATOR

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 10199[illegible]
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR 2[illegible]		
A_2		REVISED PER ECO 109598 TDRR 23677 DATE 11-2-65	HEB 11-9-65	[illegible]



PARTIAL VIEW E-E

SECTION C-C

(A2)

SEE NOTE 4 (items 117, 118, 119)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
141	1		1017426-13			PIN, PLAIN, TAPERED			
140	AS REQD	*	1001910	03386911776		TAPE, PRESSURE SENSITIVE, SPECIAL SYMBO			
139	AS REQD	*	1001909	03386911775		TAPE, PRESSURE SENSITIVE			
138	4		AN960C8	74468051004		WASHER, FLAT			
137	1		1022955	02386910496		FILTER ASSY			
136	1		1022523	03386911768		SHIM			
135	1		1022524	03386911767		SPACER			
134	1		1022526	03386911774		SPACER, CLAMPING PLATE			
133	2		1022525	03386911773		SPACER, CLAMPING PLATE			
132	4		AN565BC4H4			SCREW, CONE POINT			
131	2		1022060-001	03386910811		SPACER, APERTURE			
130	1		1022520	03386911748		RETAINER, LENS			
129	1		1004260-307	03386911553		PLATE, IDENTIFICATION			
128	2		1022192-002	03386910981-2		KNOB			
127	2		1022482	03386911528		WASHER			
126	2		1022481	03386911527		KNOB			
125	2		1022480	03386911526		STUD			
124	2		1022479	03386911525		SPACER			
123	2		MS16633-3018			RING, RETAINING			
122	1		1022478	03386911524		DECAL			
121	1		1022477	03386911478		SPACER			
120	2		1022224	03386910226		PLATE, CLAMP			
119	4		MS35337-79	74439050003		LOCKWASHER			
118	4		MS16995-17			SCREW, CAP, SOC HD			
117	1		1022195	03386910982		PLATE, COVER			
116	1		1022814-021	02386910286-2		SHAFT AND SPUR GEAR ASSY			
115	10		MS16995-1			SCREW, CAP, SOC HD			
114	2		1022194	03386910975		COVER			
113	2		1022193	03386910978		GASKET			
112	1		1022007	03386910858		RING, LOCKING			
111	1		1022006	03386910382		LENS, OBJECTIVE			
110	1		1022005	03386910857		SPACER, LENS			
109	1		1022004	03386910381		LENS, OBJECTIVE			
108	1		1022003	03386910856		RING, LOCKING			
107	1		1022002	03386910855		CELL, LENS			
106	1		1022192-001	03386910981-1		KNOB			
105	2		1022938-011	02386910433		KNOB ASSY			
104	1		1022819-021	02386910234		CONNECTOR AND LUG ASSY			
103	1		1022073-002	03386910802-2		COVER, (REWORK)			
102	4		MS16995-3			SCREW, CAP, SOC HD			
101	1		1022065	03386910804		RETAINER, BULB			
100	1		1022190	03386911022		SHIM			
99	1		1022063	03386910743		HOUSING, LAMP (MACH)			
98	1		1022515	03386911760		LENS			
97	1		1022519	03386911747		CELL, LENS			
96	1		1022521	03386911765		RING, LOCKING			
95	3		MS16995-19			SCREW, CAP, SOC HD			
94	1		1019931-011	02386910259		COVER HOUSING ASSY			
93	1		1019933-011	02386910261-1		GEAR AND HUB DENSITY FILTER ASSY			
92	1		1022814-011	02386910286-1		SHAFT AND SPUR GEAR ASSY			
91	1		1022189	03386911027		SPACER			
90	6	△	MS35249-40	74455052040		SCREW, FLAT HD			
89	1		1022821-011	02386910287		HOUSING AND GEAR ASSY			
88	1		1022028	03386910877		RING, CLAMPING			
87	1		1022026-002	03386910876		SPACER, HORIZON LENS			
86	2		1022026-001	03386910875		SPACER, HORIZON LENS			
85	2		1022032	03386910514		LENS, RELAY HORIZON			
84	1		1022025	03386910874		HOUSING, HORIZON LENS			
83	2		1022820-011	02386910281		HUB AND DIAL ASSY			
82	2	*	1001809	03386911077		CLAMP (SCD)			
81	2		1022185	03386910956		INDEX, DIAL			
80	6		MS16995-4			SCREW, CAP, SOC HD			
79	2		1022186	03386910957		BLOCK, INDEX			
78	4		MS35233-12	74455054012		SCREW, PAN HD			
77	8		MS21043-04	74443136001		NUT, SELF LOCKING			
76	8		MS35233-13	74455054013		SCREW, PAN HD			
75	1		1022819-011	02386910233		CONNECTOR AND LUG ASSY			
74	1		1022073-001	03386910802-1		COVER			
73	4		1022072	03386910814		POST			
72	4		AN340C3			NUT, PLAIN HEX			
71	4	*	1001813-001	03386910208		STANDOFF, INSULATED (SCD)			
70	1		1022066	03386910807		COVER, RETAINER			
69	2		1022818-011	02386910232		LAMP ASSY			
68	1		1022184	03386910806		RETAINER, BULB			
67	32		MS35337-77	74439050001		LOCKWASHER			
66	12		MS16995-2			SCREW, CAP, SOC HD			
65	1		1022817-011	02386910230		MOUNT, PRISM ASSY			
64	8	*	1001812	03386910207		SCREW, CAP, SOC HD (SCD)			
63	1		1022067	03386910744		HOUSING, LAMP (MACH)			
62	2		1022816-011	02386910295		BLOCK AND INSERT ASSY			
61	8	△	MS35337-78	74439050002		LOCKWASHER			
	-011	LIST OF PARTS AND MATERIALS							

1019977	1019977
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910012
DRAWN A J PERALTA DATE 4-9-65
CHECKED [illegible] 4-30-65
APPROVAL [illegible] 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

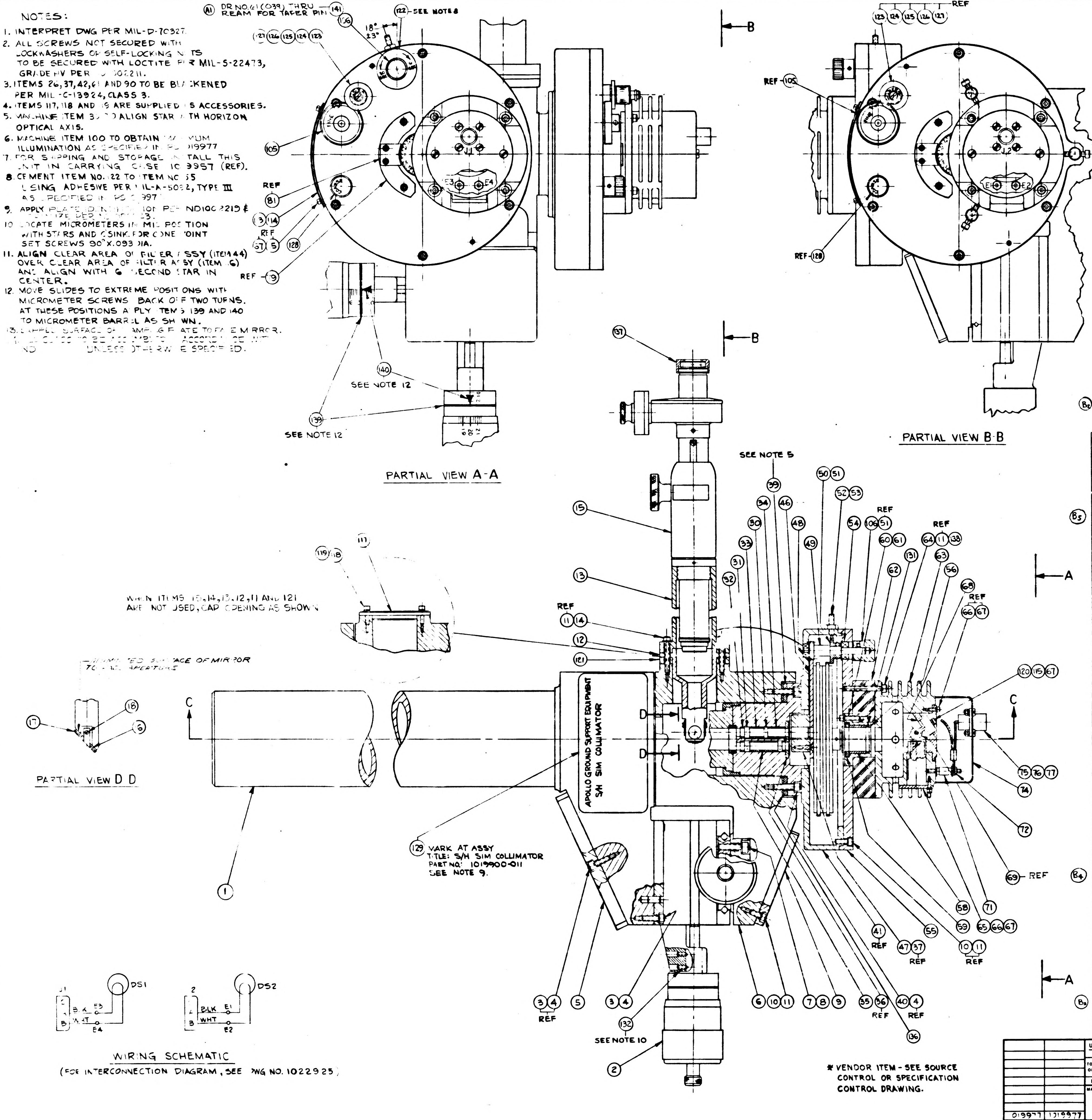
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON
SIMULATOR COLLIMATOR

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019900
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

NOTES:

1. INTERPRET DWG PER MIL-D-70327.
2. ALL SCREWS NOT SECURED WITH LOCKWASHERS OR SELF-LOCKING NUTS TO BE SECURED WITH LOCTITE PER MIL-S-22473, GRADE HV PER [illegible] 1022211.
3. △ ITEMS 26, 37, 42, 61 AND 90 TO BE BLACKENED PER MIL-C-13924, CLASS 3.
4. ITEMS 117, 118 AND 119 ARE SUPPLIED AS ACCESSORIES.
5. MACHINE ITEM 3[illegible] TO ALIGN STAR WITH HORIZON OPTICAL AXIS.
6. MACHINE ITEM 100 TO OBTAIN MAXIMUM ILLUMINATION AS SPECIFIED IN PS 1019977
7. FOR SHIPPING AND STORAGE INSTALL THIS UNIT IN CARRYING CASE 10[illegible]9957 (REF).
8. CEMENT ITEM NO. 122 TO ITEM NO. [illegible]5 USING ADHESIVE PER MIL-A-5092, TYPE III AS SPECIFIED IN PS [illegible]997[illegible]
9. APPLY PLATE IDENTIFICATION PER ND1002219 & [illegible]IZE PER [illegible]23.
10. LOCATE MICROMETERS IN MID POSITION WITH STARS AND C'SINK FOR CONE POINT SET SCREWS 90° X .093 DIA.
11. ALIGN CLEAR AREA OF FILTER ASSY (ITEM 44) OVER CLEAR AREA OF FILTER ASSY (ITEM [illegible]6) AND ALIGN WITH 6 SECOND STAR IN CENTER.
12. MOVE SLIDES TO EXTREME POSITIONS WITH MICROMETER SCREWS BACK OFF TWO TURNS. AT THESE POSITIONS APPLY ITEMS 139 AND 140 TO MICROMETER BARREL AS SHOWN.
13. LAPPED SURFACE OF CLAMPING PLATE TO FACE MIRROR.
14. [illegible] TO BE ASSEMBLED IN ACCORDANCE WITH [illegible] AND [illegible] UNLESS OTHERWISE SPECIFIED.


(A1) DR NO. 41 (039) THRU REAM FOR TAPER PIN
141
122 - SEE NOTE 8
106
18°
±3°
127 126 125 124 123
105
REF
81
13 114
REF
67 5
128
REF - 9
140
SEE NOTE 12
139
SEE NOTE 12
PARTIAL VIEW A-A
B
REF
123 124 125 126 127
REF-105
REF-128
PARTIAL VIEW B-B
137
15
13
REF
11 14
12
121
WHEN ITEMS 15, 14, 13, 12, 11 AND 121 ARE NOT USED, CAP OPENING AS SHOWN
119 118
117
LAPPED SURFACE OF MIRROR TO FACE APERTURE
17
16
6
PARTIAL VIEW D-D
C
D
D
APOLLO GROUND SUPPORT EQUIPMENT
S/H SIM COLLIMATOR
1
129 MARK AT ASSY TITLE: S/H SIM COLLIMATOR PART NO: 1019900-011 SEE NOTE 9.
SEE NOTE 5
39
34 46
30 48
33 49
31
32
50 51
52 53
54 106 51
REF
60 61
62
131
64 11 38
REF
63
56
68
REF
66 67
120 115 67
C
75 76 77
74
72
69 - REF
58
59
71
65 66 67
55
10 11
REF
41
REF
47 37
REF
3 4
REF
5
3 4
132
SEE NOTE 10
2
6 10 11
7 8 9
35 36
40 4
REF
136
A
A
J1
J2
E1 E2 E3 E4
DS1
DS2
BLK
WHT
E1 E2 E3 E4
WIRING SCHEMATIC
(FOR INTERCONNECTION DIAGRAM, SEE DWG NO. 1022925)

(B2) LIST OF MATERIALS CONTINUED ON SHEET NO. 2 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT W
60	8	*	1017418-11			SCREW, CAP, SOC HD			
59	1		1022057	03386910813		RING, LOCKING			
58	1		1022058-002	03386911033		SPACER, APERTURE			
57	1		1022061	03386910780		GLASS, DIFFUSER			
56	2		1022056	03386910810		HOUSING, DIFFUSER			
55	1		1022041	03386910886		COVER, HOUSING			
54	1	*	1001728-16			BEARING, BALL			
53	1		MS35649-84	61501051008		NUT, PLAIN HEX			
52	1	*	1017432-15			PLUNGER, QUICK RELEASE			
51	12		MS51029-1			SETSCREW, SOC, FLAT POINT			
50	1		1022181	03386910965		DETENT			
49	1		1022180	03386910964		GEARSHAFT, SPUR (24T, 48 DP)			
48	1	*	1001728-15			BEARING, BALL			
47	1		1022178	03386910966		BLOCK, LIGHT STOP			
46	1		1022179	03386910967		STOP, LIGHT			
45	2	*	1001810-001	03386910206		BEARING, BALL			
44	1		1019933-021	02386910261-2		GEAR AND HUB DENSITY FILTER ASSY			
43	4	*	1001728-17			BEARING, BALL			
42	4	△	MS35249-37	74455052037		SCREW, FLAT HD			
41	1		1022809-011	02386910285		HOUSING AND GEAR ASSY			
40	4		MS16995-27			SCREW, CAP, SOC HD			
39	1		1022171	03386910955		SHIM			
38	2		1022170	03386910951		SETSCREW			
37	6	△	MS35249-21	74455052021		SCREW, FLAT HD			
36	1		1019925-011	02386910253		PLATE AND PIN ASSY			
35	1		1022020-004	03386910872		SPACER, RELAY LENS			
34	1		1022020-003	03386910871		SPACER, RELAY LENS			
33	1		1022020-002	03386910870		SPACER, RELAY LENS			
32	3		1022020-001	03386910869		SPACER, RELAY LENS			
31	2		1022172	03386910516		LENS, RELAY			
30	2		1022031	03386910515		LENS, RELAY			
29	1		1022012	03386910861		RING, LOCKING			
28	1		1019924-011	02386910252		HOUSING AND PIN ASSY			
27	1		1022014	03386910863		SLEEVE, PILOT			
26	6	△	MS35337-77	74439050001		LOCKWASHER			
25	6	*	1017418-3			SCREW, CAP, SOC HD			
24	1		1022019	03386910868		PLATE, CLAMPING			
23	1		1022018	03386910867		PLATE, CLAMPING			
22	1		1022017	03386910866		PLATE, CLAMPING			
21	1		1022169	03386910953		WASHER, WAVE			
20	1		1022030	03386910540		MIRROR			
19	1		1019923-011	02386910251		MIRROR MOUNT AND PIN ASSY			
18	2		1022461-001	61401060006		SCREW, FLAT FIL HD			
17	1		1022000	03386910429		CLAMP, MIRROR			
16	1		1022168	03386910962		MIRROR, MICROSCOPE			
15	1	*	1001776	02386910249		FILAR MICROMETER MICROSCOPE			
14	4	*	1017418-34			SCREW, CAP, SOC HD			
13	1		1022001	03386910854		ADAPTER, MICROSCOPE			
12	1		1019922-011	02386910248		MIRROR MOUNT AND PIN ASSY			
11	30		MS35337-79	74439050003		LOCKWASHER			
10	18		MS16995-17			SCREW, CAP, SOC HD			
9	1		1022167	03386911000		PLATE			
8	6		MS35337-81	74439050005		LOCKWASHER			
7	6		MS16996-12			SCREW, CAP, SOC HD			
6	1		1022808-011	02386910288		BRACKET AND PIN ASSY			
5	1		1022166	03386910954		PLATE			
4	18		MS35337-80	74439050004		LOCKWASHER			
3	14		MS16995-26			SCREW, CAP, SOC HD			
2	1	*	1022937	02386910431		MICROPOSITIONER			
1	1		1022807-011	02386910292		HOUSING AND PIN ASSY			
	-011								

(B5) (B4) (B3)

LIST OF PARTS AND MATERIALS

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR [illegible]		
A2		REVISED PER ECO 109598 TDRR 23677 DATE 11-2-65	HEB 11-9-65	11-17-65
B1		REVISED PER ECO 111999 TDRR 23682 DATE 11-5-65	M.S. 12-[illegible]-65	12/10/65

NEXT ASSY	USED ON
019977	1019977

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

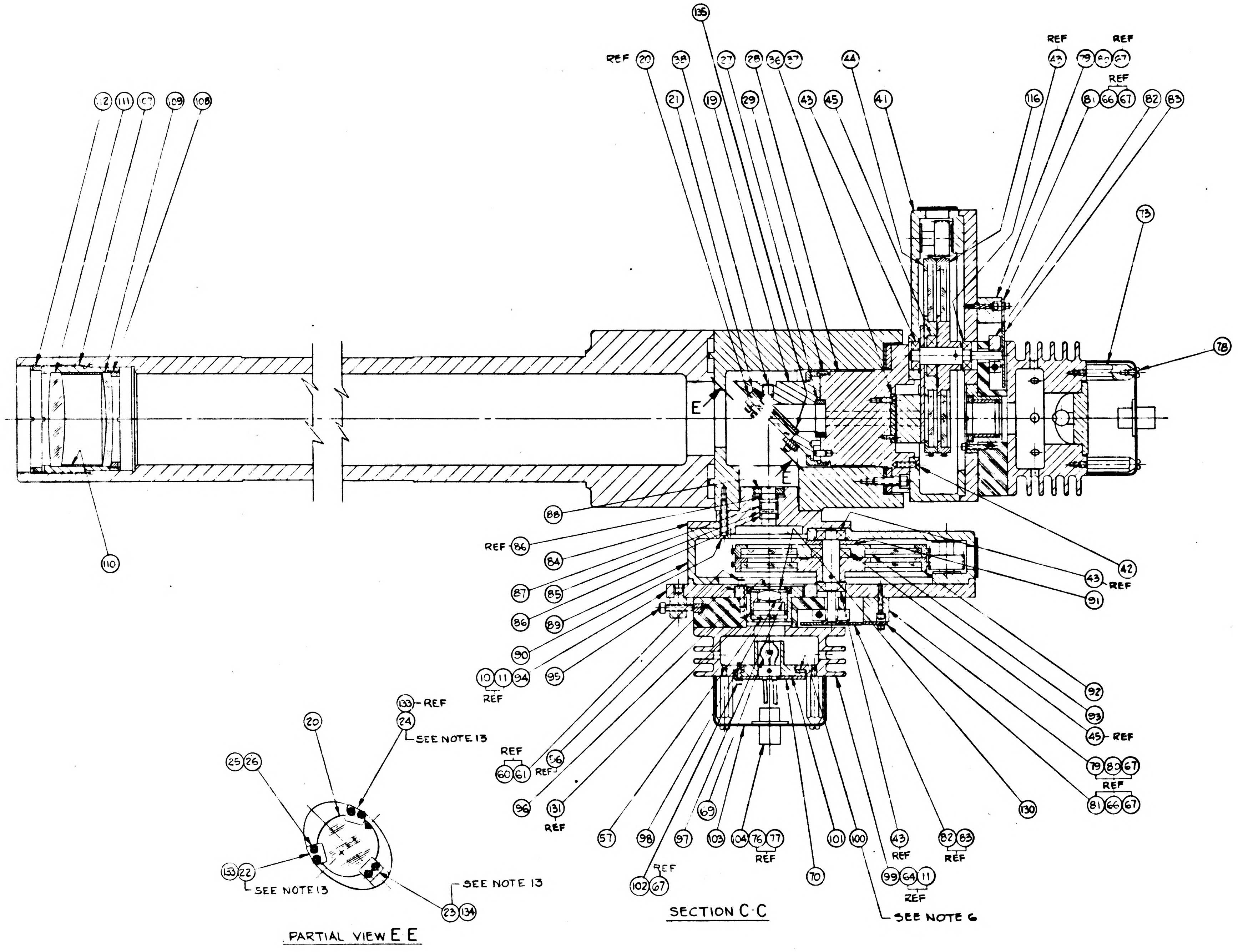
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910012
DRAWN AJ PERALTA DATE 4-8-65
CHECKED B. [illegible] 4-30-65
APPROVAL [illegible] 4-[illegible]-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON
SIMULATOR COLLIMATOR

CODE IDENT NO. [illegible]9944
SIZE E
NASA NUMBER 10199[illegible]
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR 21779		
A_2		REVISED PER ECO 109598 TDRR 23677 DATE 11-2-65	HEB 11-9-65	
B_7		REVISED PER ECO 11177 TDRR 23682 DATE 11-8-65	M.S. 2-14-66	



PARTIAL VIEW E E

SECTION C-C

SEE NOTE 4 (items 117–119)

	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
A2	141	1		1017426-13			PIN, PLAIN, TAPERED			
	140	AS REQD	*	1001910	03386911776		TAPE, PRESSURE SENSITIVE, SPECIAL SYMBOL			
	139	AS REQD	*	1001909	03386911775		TAPE, PRESSURE SENSITIVE			
	138	4		AN960C8	74468051004		WASHER, FLAT			
	137	1		1022955	02386910496		FILTER ASSY			
	136	1		1022523	03386911768		SHIM			
	135	1		1022524	03386911767		SPACER			
	134	1		1022526	03386911774		SPACER, CLAMPING PLATE			
	133	2		1022525	03386911773		SPACER, CLAMPING PLATE			
	132	4		AN 565BC4H4			SCREW, CONE POINT			
	131	2		1022060-001	03386910811		SPACER, APERTURE			
	130	1		1022520	03386911146		RETAINER, LENS			
B1	129	1		1004260-305	03386911937		PLATE, IDENTIFICATION			
	128	2		1022192-002	03386910981-2		KNOB			
	127	2		1022482	03386911528		WASHER			
	126	2		1022481	03386911527		KNOB			
	125	2		1022480	03386911526		STUD			
	124	2		1022479	03386911525		SPACER			
	123	2		MS16633-3018			RING, RETAINING			
	122	1		1022478	03386911524		DECAL			
	121	1		1022477	03386911478		SPACER			
	120	2		1022224	03386910226		PLATE, CLAMP			
	119	4		MS35337-79	74439050003		LOCKWASHER			
	118	4		MS16995-17			SCREW, CAP, SOC HD			
	117	1		1022195	03386910982		PLATE, COVER			
	116	1		1022814-021	02386910286-2		SHAFT AND SPUR GEAR ASSY			
	115	10		MS16995-1			SCREW, CAP, SOC HD			
	114	2		1022194	03386910975		COVER			
	113	2		1022193	03386910978		GASKET			
	112	1		1022007	03386910858		RING, LOCKING			
	111	1		1022006	03386910382		LENS, OBJECTIVE			
	110	1		1022005	03386910857		SPACER, LENS			
	109	1		1022004	03386910381		LENS, OBJECTIVE			
	108	1		1022003	03386910856		RING, LOCKING			
	107	1		1022002	03386910855		CELL, LENS			
	106	1		1022192-001	03386910981-1		KNOB			
	105	2		1022935-011	02386910433		KNOB ASSY			
	104	1		1022819-021	02386910234		CONNECTOR AND LUG ASSY			
	103	1		1022073-002	03386910802-2		COVER, (REWORK)			
	102	4		MS16995-3			SCREW, CAP, SOC HD			
	101	1		1022065	03386910804		RETAINER, BULB			
	100	1		1022190	03386911022		SHIM			
	99	1		1022063	03386910743		HOUSING, LAMP (MACH)			
	98	1		1022515	03386911760		LENS			
	97	1		1022519	03386911747		CELL, LENS			
	96	1		1022521	03386911765		RING, LOCKING			
	95	3		MS16995-19			SCREW, CAP, SOC HD			
	94	1		1019931-011	02386910259		COVER HOUSING ASSY			
	93	1		1019933-011	02386910261-1		GEAR AND HUB DENSITY FILTER ASSY			
	92	1		1022814-011	02386910286-1		SHAFT AND SPUR GEAR ASSY			
	91	1		1022189	03386911027		SPACER			
	90	6	Δ	MS35249-40	74455052040		SCREW, FLAT HD			
	89	1		1022821-011	02386910287		HOUSING AND GEAR ASSY			
	88	1		1022028	03386910877		RING, CLAMPING			
	87	1		1022026-002	03386910876		SPACER, HORIZON LENS			
	86	2		1022026-001	03386910875		SPACER, HORIZON LENS			
	85	2		1022032	03386910514		LENS, RELAY HORIZON			
	84	1		1022025	03386910874		HOUSING, HORIZON LENS			
	83	2		1022820-011	02386910281		HUB AND DIAL ASSY			
	82	2	*	1001809	03386911077		CLAMP (SCD)			
	81	2		1022185	03386910956		INDEX, DIAL			
	80	6		MS16995-4			SCREW, CAP, SOC HD			
	79	2		1022186	03386910957		BLOCK, INDEX			
	78	4		MS35233-12	74455054012		SCREW, PAN HD			
	77	8		MS21043-04	74443136001		NUT, SELF LOCKING			
	76	8		MS35233-13	74455054013		SCREW, PAN HD			
	75	1		1022819-011	02386910233		CONNECTOR AND LUG ASSY			
	74	1		1022073-001	03386910802-1		COVER			
	73	4		1022072	03386910814		POST			
	72	4		AN340C3			NUT, PLAIN HEX			
B7	71	4	*	1001813-001	03386910208		STANDOFF, INSULATED			
	70	1		1022066	03386910807		COVER, RETAINER			
	69	2		1022818-011	02386910232		LAMP ASSY			
	68	1		1022184	03386910806		RETAINER, BULB			
	67	32		MS35337-77	74439050001		LOCKWASHER			
	66	12		MS16995-2			SCREW, CAP, SOC HD			
	65	1		1022817-011	02386910230		MOUNT, PRISM ASSY			
B6	64	8	*	1001812	03386910207		SCREW, CAP, SOC HD			
	63	1		1022067	03386910744		HOUSING, LAMP (MACH)			
	62	2		1022816-011	02386910295		BLOCK AND INSERT ASSY			
	61	8	Δ	MS35337-78	74439050002		LOCKWASHER			
		-011								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019977	1019977

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

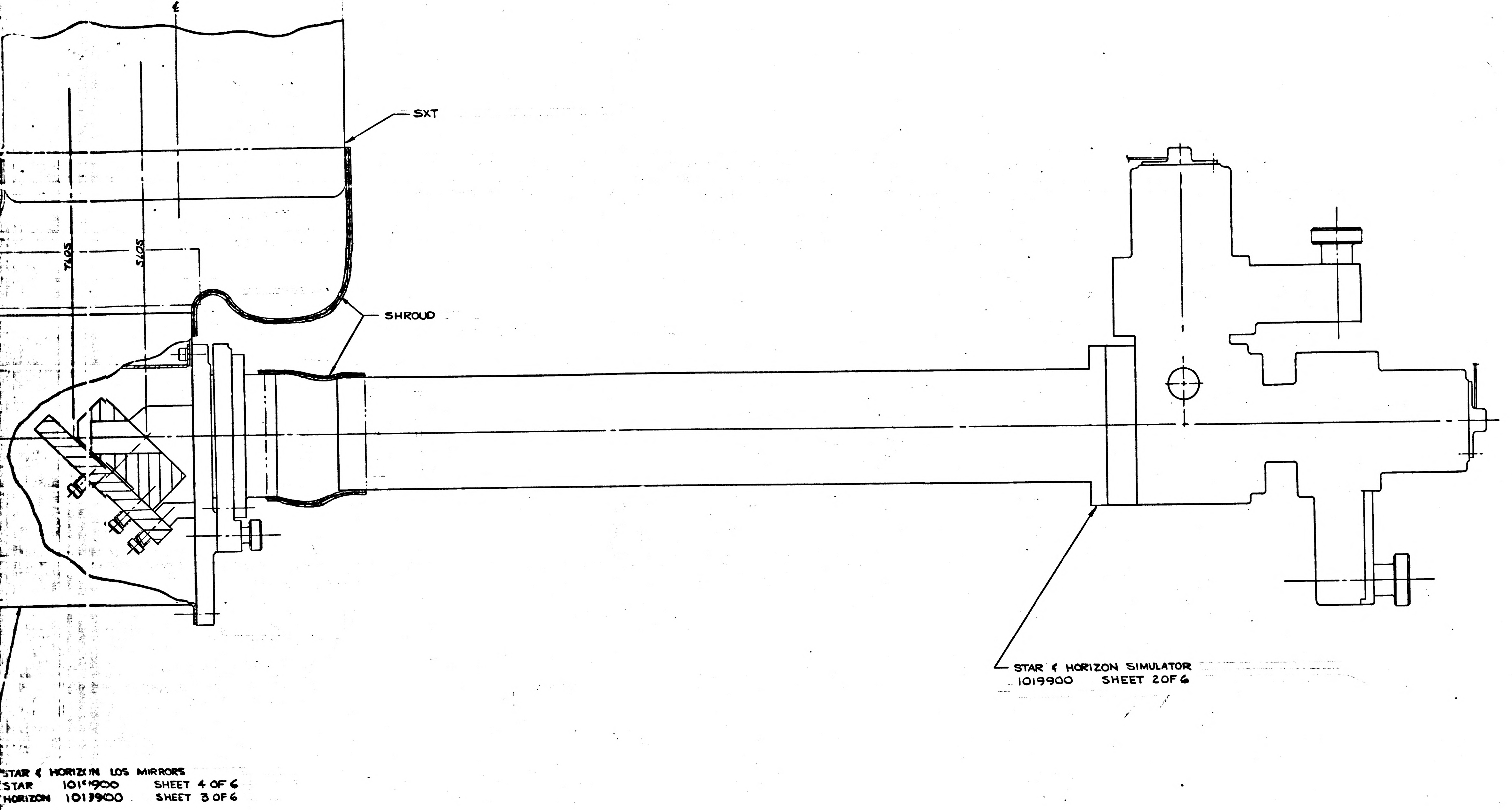
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0338691001 2
DRAWN A J PERALTA DATE 4-9-65
CHECKED 4-30-65
APPROVAL 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON
SIMULATOR COLLIMATOR

CODE IDENT NO 89944
SIZE E
NASA NUMBER 1019900
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF

REVISIONS TOGR 16:1 ... 2/12/65				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


℄
SXT
TLOS
SLOS
SHROUD
STAR & HORIZON SIMULATOR
1019900 SHEET 2OF6
STAR & HORIZON LOS MIRRORS
STAR 101°900 SHEET 4 OF 6
HORIZON 1019900 SHEET 3 OF 6

1019900

(24)

F-2

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN V.P. Dowse DATE 2-4-65
CHECKED
APPROVAL T. Mennanor 2-4-65
APPROVAL
NASA APPROVAL
NIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

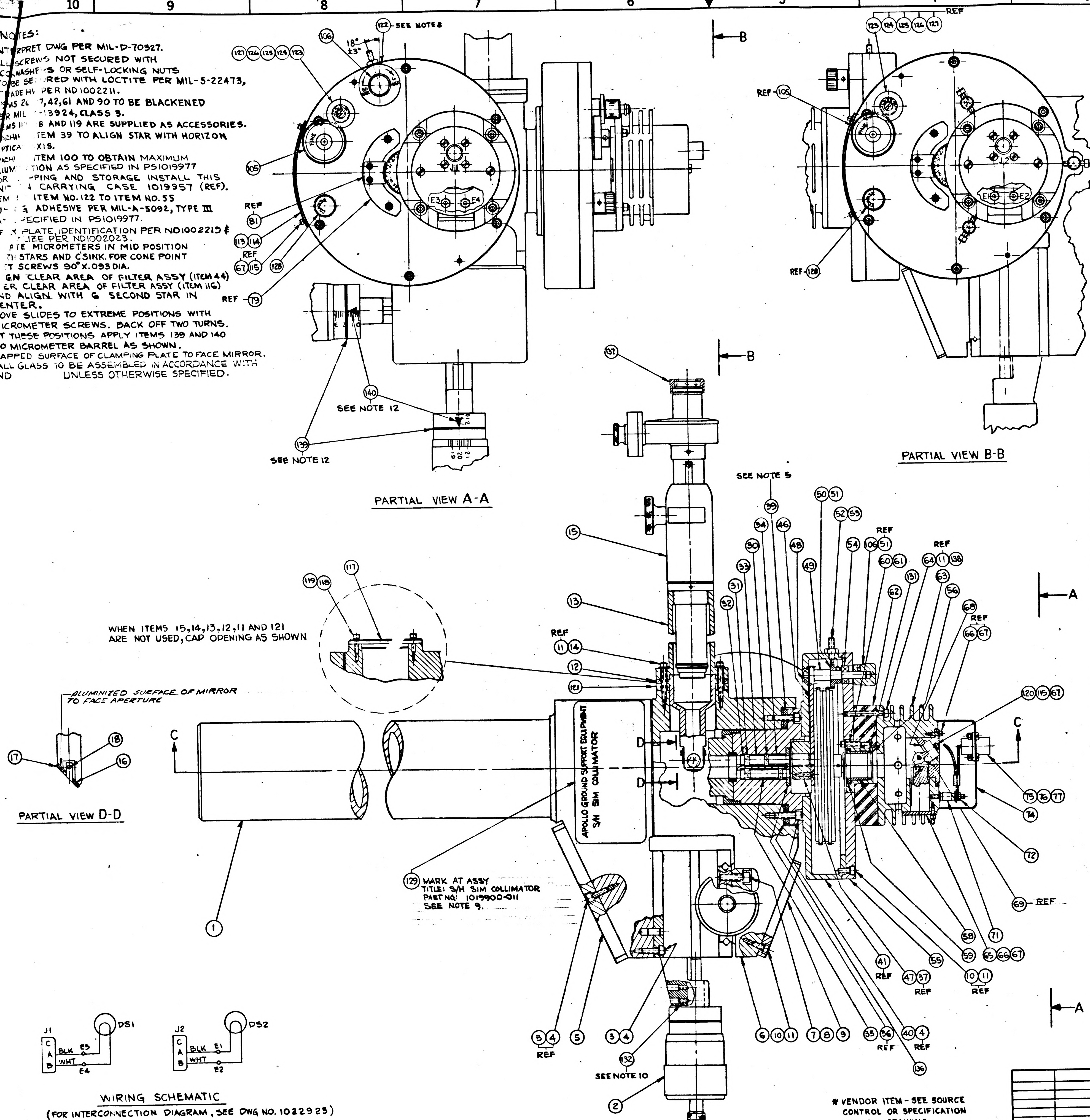
TITLE
STAR & HORIZON PHOTO.
SIMULATOR
MECHANIZATION DWG

CODE IDENT NO.
SIZE R
NASA NUMBER 1019900
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

E-128

NOTES:

1. INTERPRET DWG PER MIL-D-70327.
2. ALL SCREWS NOT SECURED WITH LOCKWASHERS OR SELF-LOCKING NUTS TO BE SECURED WITH LOCTITE PER MIL-S-22473, GRADE HV PER ND1002211.
3. Δ ITEMS 2[illegible]7,42,61 AND 90 TO BE BLACKENED PER MIL [illegible]-13924, CLASS 3.
4. ITEMS 11[illegible]8 AND 119 ARE SUPPLIED AS ACCESSORIES.
5. MACHINE ITEM 39 TO ALIGN STAR WITH HORIZON OPTICAL AXIS.
6. MACHINE ITEM 100 TO OBTAIN MAXIMUM ILLUMINATION AS SPECIFIED IN PS1019977
7. FOR SHIPPING AND STORAGE INSTALL THIS UNIT IN CARRYING CASE 1019957 (REF).
8. CEMENT ITEM NO. 122 TO ITEM NO. 55 USING ADHESIVE PER MIL-A-5092, TYPE III AS SPECIFIED IN PS1019977.
9. AFFIX PLATE, IDENTIFICATION PER ND1002219 & [illegible]ALIZE PER ND1002023.
10. LOCATE MICROMETERS IN MID POSITION WITH STARS AND C'SINK. FOR CONE POINT SET SCREWS 90° X .093 DIA.
11. ALIGN CLEAR AREA OF FILTER ASSY (ITEM 44) OVER CLEAR AREA OF FILTER ASSY (ITEM 116) AND ALIGN WITH 6 SECOND STAR IN CENTER.
12. MOVE SLIDES TO EXTREME POSITIONS WITH MICROMETER SCREWS. BACK OFF TWO TURNS. AT THESE POSITIONS APPLY ITEMS 139 AND 140 TO MICROMETER BARREL AS SHOWN.
13. LAPPED SURFACE OF CLAMPING PLATE TO FACE MIRROR.
14. ALL GLASS TO BE ASSEMBLED IN ACCORDANCE WITH ND UNLESS OTHERWISE SPECIFIED.


122 - SEE NOTE 8
18°
±3°
106
127 126 125 124 123
105
REF 81
113 114
REF 67 115
128
REF 79
140
SEE NOTE 12
139
SEE NOTE 12
B
B
REF 105
123 124 125 126 127 REF
REF 128
137
SEE NOTE 5
15
13
12
121
REF 11 14
119 118 117
WHEN ITEMS 15,14,13,12,11 AND 121 ARE NOT USED, CAP OPENING AS SHOWN
ALUMINIZED SURFACE OF MIRROR TO FACE APERTURE
17 18 16
C
C
D
D
A
A
APOLLO GROUND SUPPORT EQUIPMENT S/H SIM COLLIMATOR
129 MARK AT ASSY TITLE: S/H SIM COLLIMATOR PART NO: 1019900-011 SEE NOTE 9.
1
99 34 46 30 48 33 49 31 52 50 51 52 53 54 106 51 60 61 62 131 64 11 138 63 56 68 66 67 REF
120 115 67
75 76 77
74
72
69 - REF
58 71 59 65 66 67
41 REF 47 37 REF 55 10 11 REF
3 4 REF 5 3 4 6 10 11 7 8 9 35 36 REF 40 4 REF 136
132 SEE NOTE 10
2
J1 C A B BLK E3 WHT E4 DS1
J2 C A B BLK E1 WHT E2 DS2

PARTIAL VIEW A-A

PARTIAL VIEW B-B

PARTIAL VIEW D-D

WIRING SCHEMATIC
(FOR INTERCONNECTION DIAGRAM, SEE DWG NO. 1022925)

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
60	8	*	1017418-11			SCREW, CAP, SOC HD			
59	1		1022057	03386910813		RING, LOCKING			
58	1		1022058-002	03386911033		SPACER, APERTURE			
57	1		1022061	03386910780		GLASS, DIFFUSER			
56	2		1022056	03386910810		HOUSING, DIFFUSER			
55	1		1022041	03386910886		COVER, HOUSING			
54	1	*	1001728-16			BEARING, BALL			
53	1		MS35649-84	61501051008		NUT, PLAIN HEX			
52	1	*	1017432-15			PLUNGER, QUICK RELEASE (SCD)			
51	12		MS51029-1			SETSCREW, SOC, FLAT POINT			
50	1		1022181	03386910965		DETENT			
49	1		1022180	03386910964		GEARSHAFT, SPUR (24T, 48 DP)			
48	1	*	1001728-15			BEARING, BALL			
47	1		1022178	03386910966		BLOCK, LIGHT STOP			
46	1		1022179	03386910967		STOP, LIGHT			
45	2	*	1001810-001	03386910206		BEARING, BALL			
44	1		1019933-021	02386910261-2		GEAR AND HUB DENSITY FILTER ASSY			
43	4	*	1001728-17			BEARING, BALL			
42	4	Δ	MS35249-37	74455052097		SCREW, FLAT HD			
41	1		1022809-011	02386910285		HOUSING AND GEAR ASSY			
40	4		MS16995-27			SCREW, CAP, SOC HD			
39	1		1022171	03386910955		SHIM			
38	2		1022170	03386910951		SETSCREW			
37	6	Δ	MS35249-21	74455052021		SCREW, FLAT HD			
36	1		1019925-011	02386910253		PLATE AND PIN ASSY			
35	1		1022020-004	03386910872		SPACER, RELAY LENS			
34	1		1022020-003	03386910871		SPACER, RELAY LENS			
33	1		1022020-002	03386910870		SPACER, RELAY LENS			
32	3		1022020-001	03386910869		SPACER, RELAY LENS			
31	2		1022172	03386910516		LENS, RELAY			
30	2		1022031	03386910515		LENS, RELAY			
29	1		1022012	03386910861		RING, LOCKING			
28	1		1019924-011	02386910252		HOUSING AND PIN ASSY			
27	1		1022014	03386910863		SLEEVE, PILOT			
26	6	Δ	MS35337-77	74439050001		LOCKWASHER			
25	6	*	1017418-3			SCREW, CAP, SOC HD			
24	1		1022019	03386910868		PLATE, CLAMPING			
23	1		1022018	03386910867		PLATE, CLAMPING			
22	1		1022017	03386910866		PLATE, CLAMPING			
21	1		1022169	03386910953		WASHER, WAVE			
20	1		1022030	03386910540		MIRROR			
19	1		1019923-011	02386910251		MIRROR MOUNT AND PIN ASSY			
18	2		1022461-001	61401060006		SCREW, FLAT FIL HD			
17	1		1022000	03386910429		CLAMP, MIRROR			
16	1		1022168	03386910962		MIRROR, MICROSCOPE			
15	1	*	1001776	02386910249		FILAR MICROMETER MICROSCOPE (SCD)			
14	4	*	1017418-34			SCREW, CAP, SOC HD			
13	1		1022001	03386910854		ADAPTER, MICROSCOPE			
12	1		1019922-011	02386910248		MIRROR MOUNT AND PIN ASSY			
11	30		MS35337-79	74439050003		LOCKWASHER			
10	18		MS16995-17			SCREW, CAP, SOC HD			
9	1		1022167	03386911000		PLATE			
8	6		MS35337-81	74439050005		LOCKWASHER			
7	6		MS16996-12			SCREW, CAP, SOC HD			
6	1		1022808-011	02386910288		BRACKET AND PIN ASSY			
5	1		1022166	03386910954		PLATE			
4	18		MS35337-80	74439050004		LOCKWASHER			
3	14		MS16995-26			SCREW, CAP, SOC HD			
2	1	*	1022937	02386910431		MICROPOSITIONER (SCD)			
1	1		1022807-011	02386910292		HOUSING AND PIN ASSY			
	-011		LIST OF PARTS AND MATERIALS						

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR 21729		

1019977	1019977
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

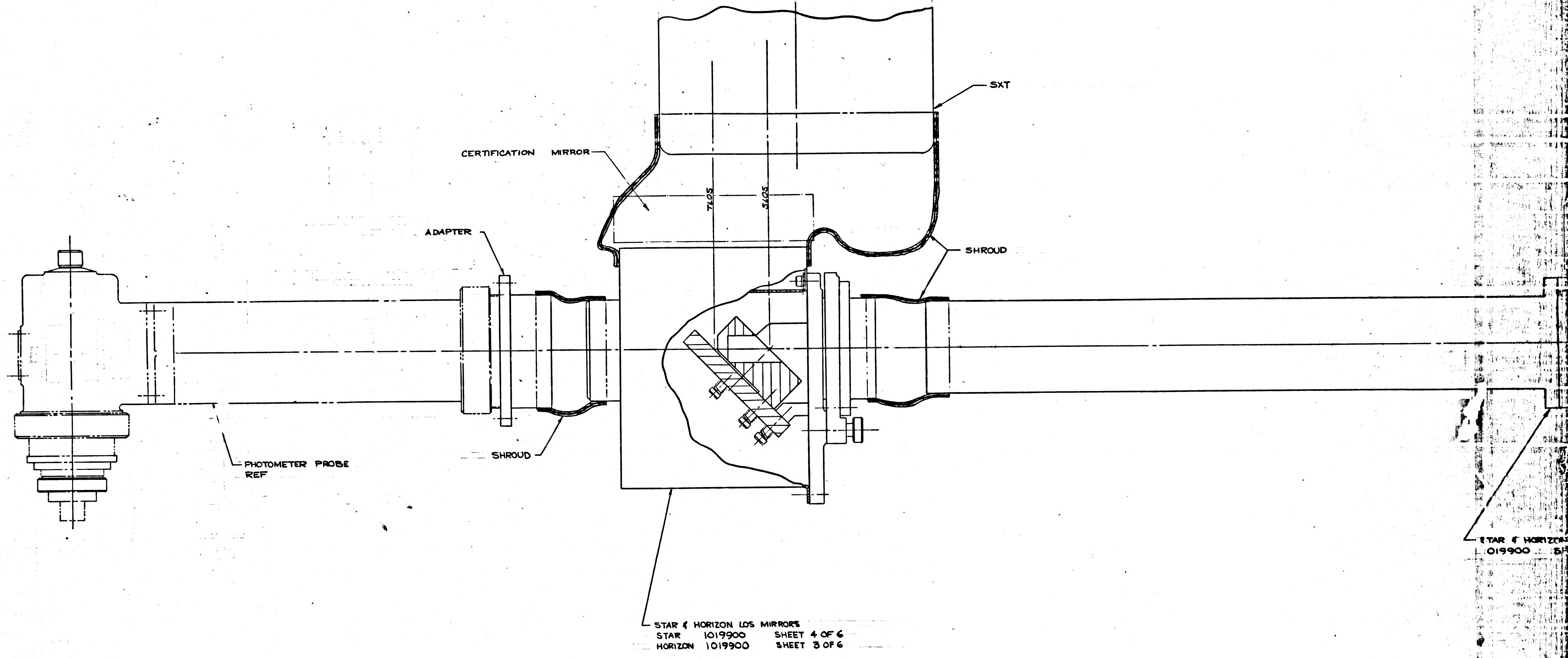
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910012
DRAWN AJ PERALTA DATE 4-8-65
CHECKED [illegible] 4-30-65
APPROVAL [illegible] 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

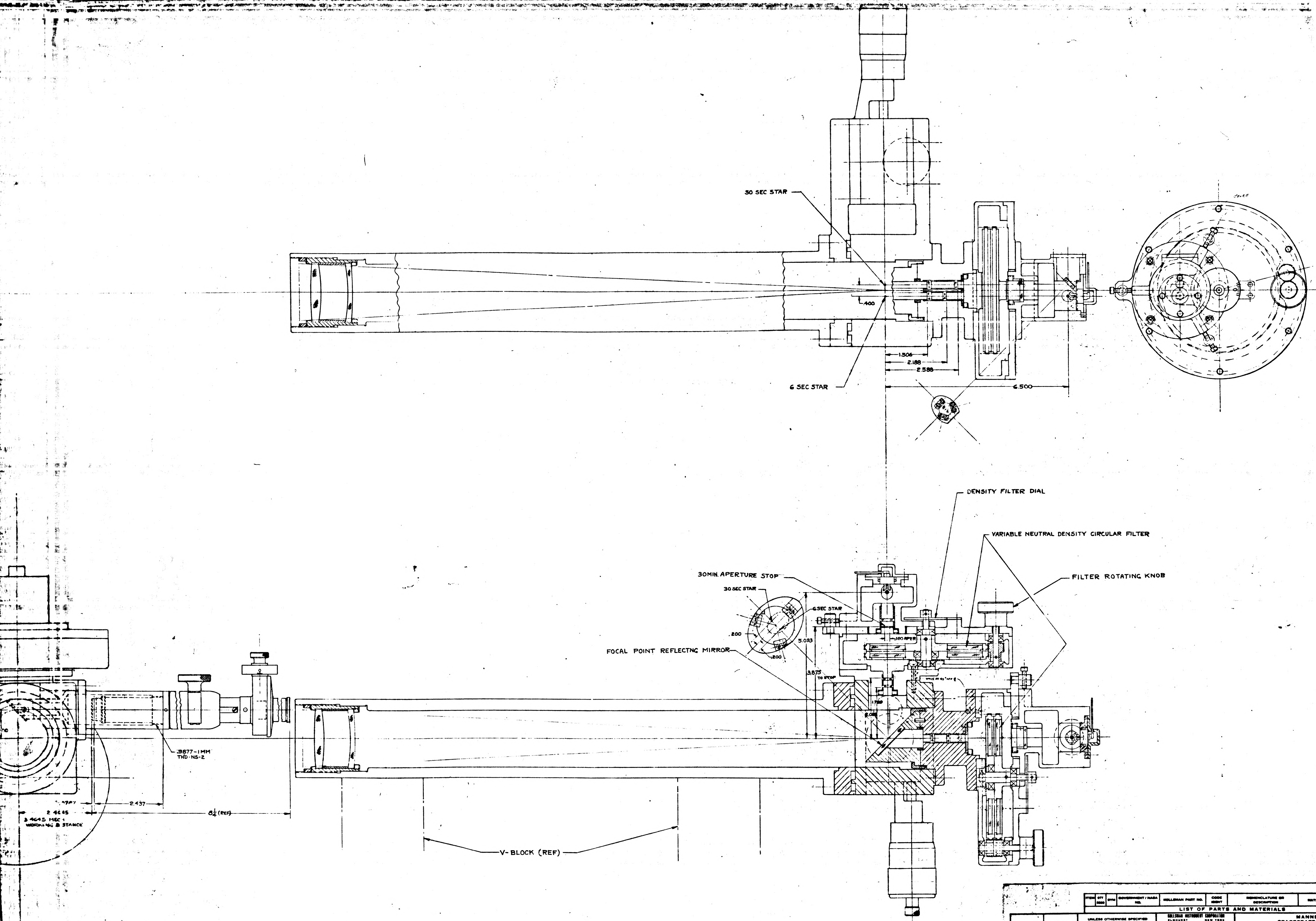
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON SIMULATOR COLLIMATOR

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019900
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019900


℄
SXT
CERTIFICATION MIRROR
TLOS
SLOS
SHROUD
ADAPTER
SHROUD
PHOTOMETER PROBE
REF
STAR & HORIZON LOS MIRRORS
STAR 1019900 SHEET 4 OF 6
HORIZON 1019900 SHEET 3 OF 6
STAR & HORIZON
019900


30 SEC STAR
.400
1.506
2.188
2.588
6.500
6 SEC STAR
DENSITY FILTER DIAL
VARIABLE NEUTRAL DENSITY CIRCULAR FILTER
FILTER ROTATING KNOB
30MIN. APERTURE STOP
30 SEC STAR
6SEC STAR
.200
.200
5.093
3.875 TO STOP
FOCAL POINT REFLECTNG MIRROR
.3877-1MM THD-NS-2
2.437
2 4645
3 4645 MEC'L WORKING DISTANCE
8¼ (REF)
V-BLOCK (REF)

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT.

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL. ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

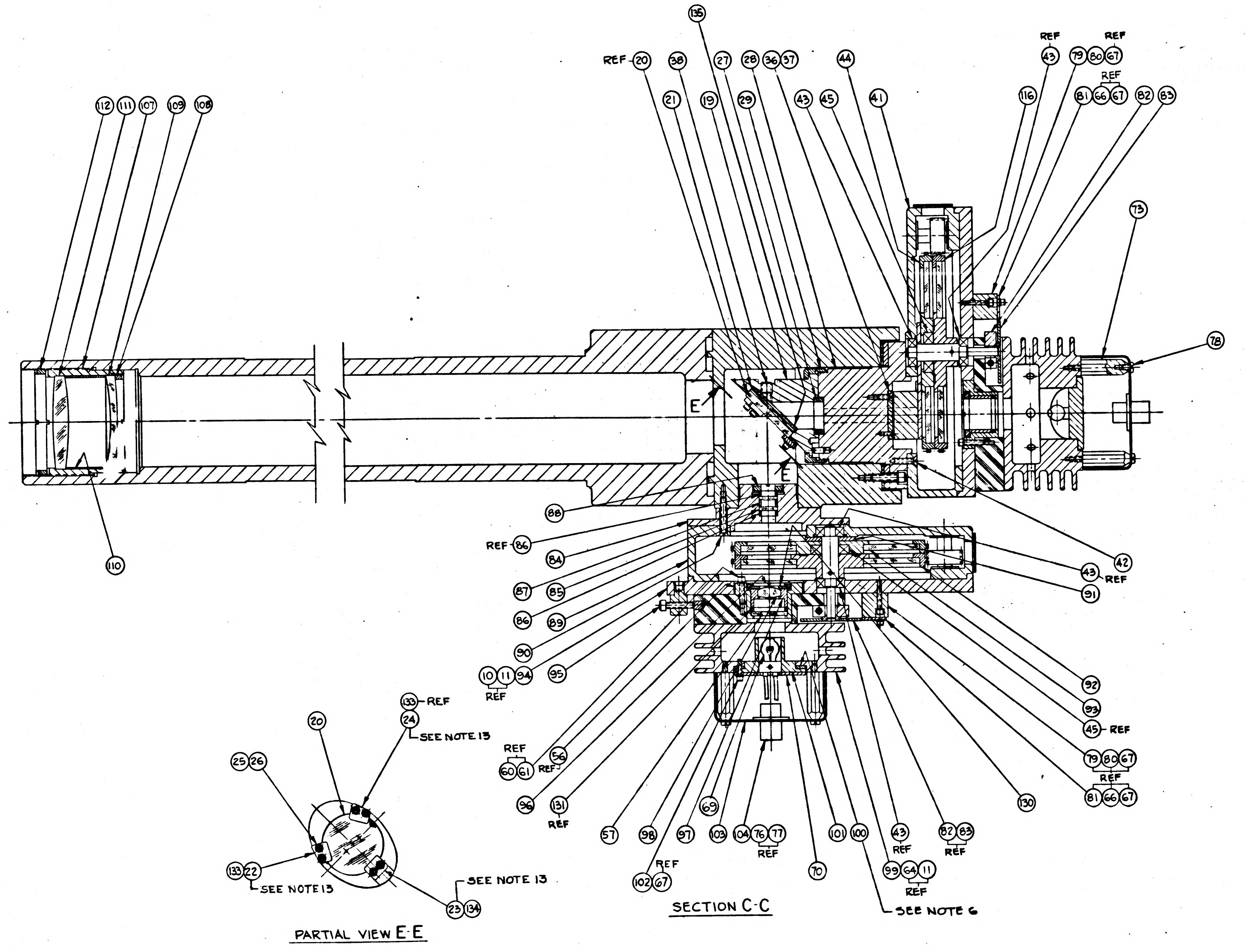
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 2-05-65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR AND HORIZON
SIMULATOR MECHANISM

CODE IDENT NO.
SIZE R
NASA NUMBER 1015900
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 2 OF 5

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TDRR 21729		



PARTIAL VIEW E-E

SECTION C-C

SEE NOTE 4 (items 117–119)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UF v
140	AS REQD	*	1001910	03386911776		TAPE, PRESSURE SENSITIVE, SPECIAL SYMBOL			
139	AS REQD	*	1001909	03386911775		TAPE, PRESSURE SENSITIVE			
138	4		AN960C8	74468051004		WASHER, FLAT			
137	1		1022955	02386910496		FILTER ASSY			
136	1		1022523	03386911768		SHIM			
135	1		1022524	03386911767		SPACER			
134	1		1022526	03386911774		SPACER, CLAMPING PLATE			
133	2		1022525	03386911773		SPACER, CLAMPING PLATE			
132	4		AN 565BC4H4			SCREW, CONE POINT			
131	2		1022060-001	03386910811		SPACER, APERTURE			
130	1		1022520	03386911748		RETAINER, LENS			
129	1		1004260-307	03386911553		PLATE, IDENTIFICATION			
128	2		1022192-002	03386910981-2		KNOB			
127	2		1022482	03386911528		WASHER			
126	2		1022481	03386911527		KNOB			
125	2		1022480	03386911526		STUD			
124	2		1022479	03386911525		SPACER			
123	2		MS16633-3018			RING, RETAINING			
122	1		1022478	03386911524		DECAL			
121	1		1022477	03386911478		SPACER			
120	2		1022224	03386910226		PLATE, CLAMP			
119	4		MS35337-79	74439050003		LOCKWASHER			
118	4		MS16995-17			SCREW, CAP, SOC HD			
117	1		1022195	03386910982		PLATE, COVER			
116	1		1022814-021	02386910286-2		SHAFT AND SPUR GEAR ASSY			
115	10		MS16995-1			SCREW, CAP, SOC HD			
114	2		1022194	03386910975		COVER			
113	2		1022193	03386910978		GASKET			
112	1		1022007	03386910858		RING, LOCKING			
111	1		1022006	03386910382		LENS, OBJECTIVE			
110	1		1022005	03386910857		SPACER, LENS			
109	1		1022004	03386910381		LENS, OBJECTIVE			
108	1		1022003	03386910856		RING, LOCKING			
107	1		1022002	03386910855		CELL, LENS			
106	1		1022192-001	03386910981-1		KNOB			
105	2		1022938-011	02386910433		KNOB ASSY			
104	1		1022819-021	02386910234		CONNECTOR AND LUG ASSY			
103	1		1022073-002	03386910802-2		COVER, (REWORK)			
102	4		MS16995-3			SCREW, CAP, SOC HD			
101	1		1022065	03386910804		RETAINER, BULB			
100	1		1022190	03386911022		SHIM			
99	1		1022063	03386910743		HOUSING, LAMP (MACH)			
98	1		1022515	03386911760		LENS			
97	1		1022519	03386911747		CELL, LENS			
96	1		1022521	03386911765		RING, LOCKING			
95	3		MS16995-19			SCREW, CAP, SOC HD			
94	1		1019931-011	02386910259		COVER HOUSING ASSY			
93	1		1019933-011	02386910261-1		GEAR AND HUB DENSITY FILTER ASSY			
92	1		1022814-011	02386910286-1		SHAFT AND SPUR GEAR ASSY			
91	1		1022189	03386911027		SPACER			
90	6	△	MS35249-40	74455052040		SCREW, FLAT HD			
89	1		1022821-011	02386910287		HOUSING AND GEAR ASSY			
88	1		1022028	03386910877		RING, CLAMPING			
87	1		1022026-002	03386910876		SPACER, HORIZON LENS			
86	2		1022026-001	03386910875		SPACER, HORIZON LENS			
85	2		1022032	03386910514		LENS, RELAY HORIZON			
84	1		1022025	03386910874		HOUSING, HORIZON LENS			
83	2		1022820-011	02386910281		HUB AND DIAL ASSY			
82	2	*	1001809	03386911077		CLAMP (SCD)			
81	2		1022185	03386910956		INDEX, DIAL			
80	6		MS16995-4			SCREW, CAP, SOC HD			
79	2		1022186	03386910957		BLOCK, INDEX			
78	4		MS35233-12	74455054012		SCREW, PAN HD			
77	8		MS21043-04	74443136001		NUT, SELF LOCKING			
76	8		MS35233-13	74455054013		SCREW, PAN HD			
75	1		1022819-011	02386910233		CONNECTOR AND LUG ASSY			
74	1		1022073-001	03386910802-1		COVER			
73	4		1022072	03386910814		POST			
72	4		AN340C3			NUT, PLAIN HEX			
71	4	*	1001813-001	03386910208		STANDOFF, INSULATED (SCD)			
70	1		1022066	03386910807		COVER, RETAINER			
69	2		1022818-011	02386910232		LAMP ASSY			
68	1		1022184	03386910806		RETAINER, BULB			
67	32		MS35337-77	74439050001		LOCKWASHER			
66	12		MS16995-2			SCREW, CAP, SOC HD			
65	1		1022817-011	02386910230		MOUNT, PRISM ASSY			
64	8	*	1001812	03386910207		SCREW, CAP, SOC HD (SCD)			
63	1		1022067	03386910744		HOUSING, LAMP (MACH)			
62	2		1022816-011	02386910295		BLOCK AND INSERT ASSY			
61	8	△	MS35337-78	74439050002		LOCKWASHER			
	-011								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019977	1019977

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

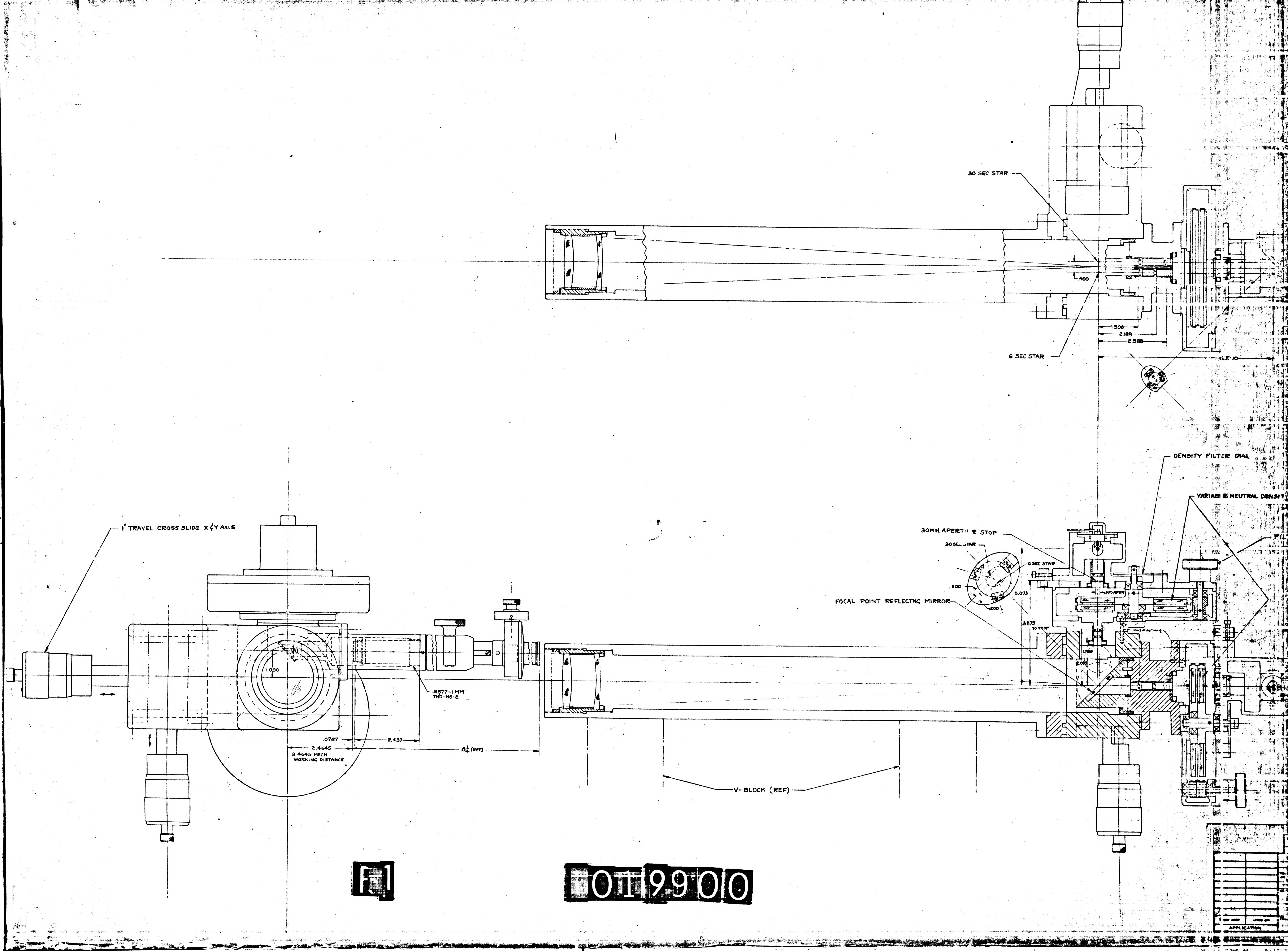
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910012
DRAWN A J PERALTA DATE 4-9-65
CHECKED 4-30-65
APPROVAL 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR / HORIZON
SIMULATOR COLLIMATOR

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019900
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

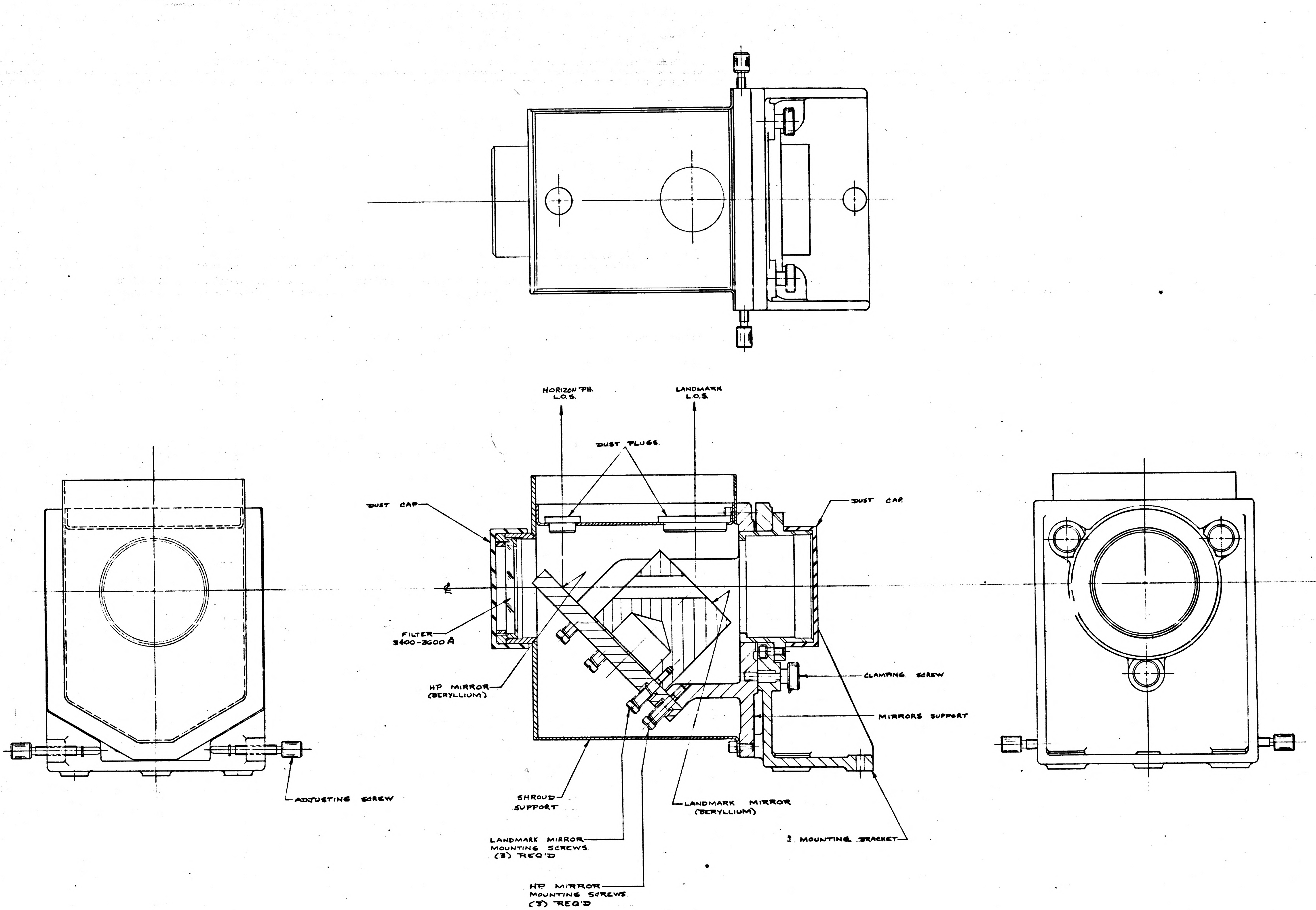
MASTER


30 SEC STAR
.400
1.506
2.188
2.588
6 SEC STAR
5.5·0
DENSITY FILTER DIAL
VARIABLE NEUTRAL DENSITY
30MIN. APERTURE STOP
30 SEC STAR
6 SEC STAR
.200
.200
5.093
.180 APER
FOCAL POINT REFLECTNG MIRROR
3.875 TO STOP
1.780
2.060
1" TRAVEL CROSS SLIDE X & Y AXIS
1.000
.9877-1MM THD-NS-2
.0787
2.437
2.4645
3.4645 MECH WORKING DISTANCE
8¼ (REF)
V-BLOCK (REF)
APPLICATION

F1

0119900

T ORR [illegible]


HORIZON PH. L.O.S.
LANDMARK L.O.S.
DUST PLUGS.
DUST CAP
DUST CAP.
℄
FILTER 3400-3600 Å
HP MIRROR (BERYLLIUM)
CLAMPING SCREW
MIRRORS SUPPORT
SHROUD SUPPORT
LANDMARK MIRROR (BERYLLIUM)
MOUNTING BRACKET
LANDMARK MIRROR MOUNTING SCREWS. (3) REQ'D
HP MIRROR MOUNTING SCREWS. (3) REQ'D
ADJUSTING SCREW

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± | DECIMALS ± | ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

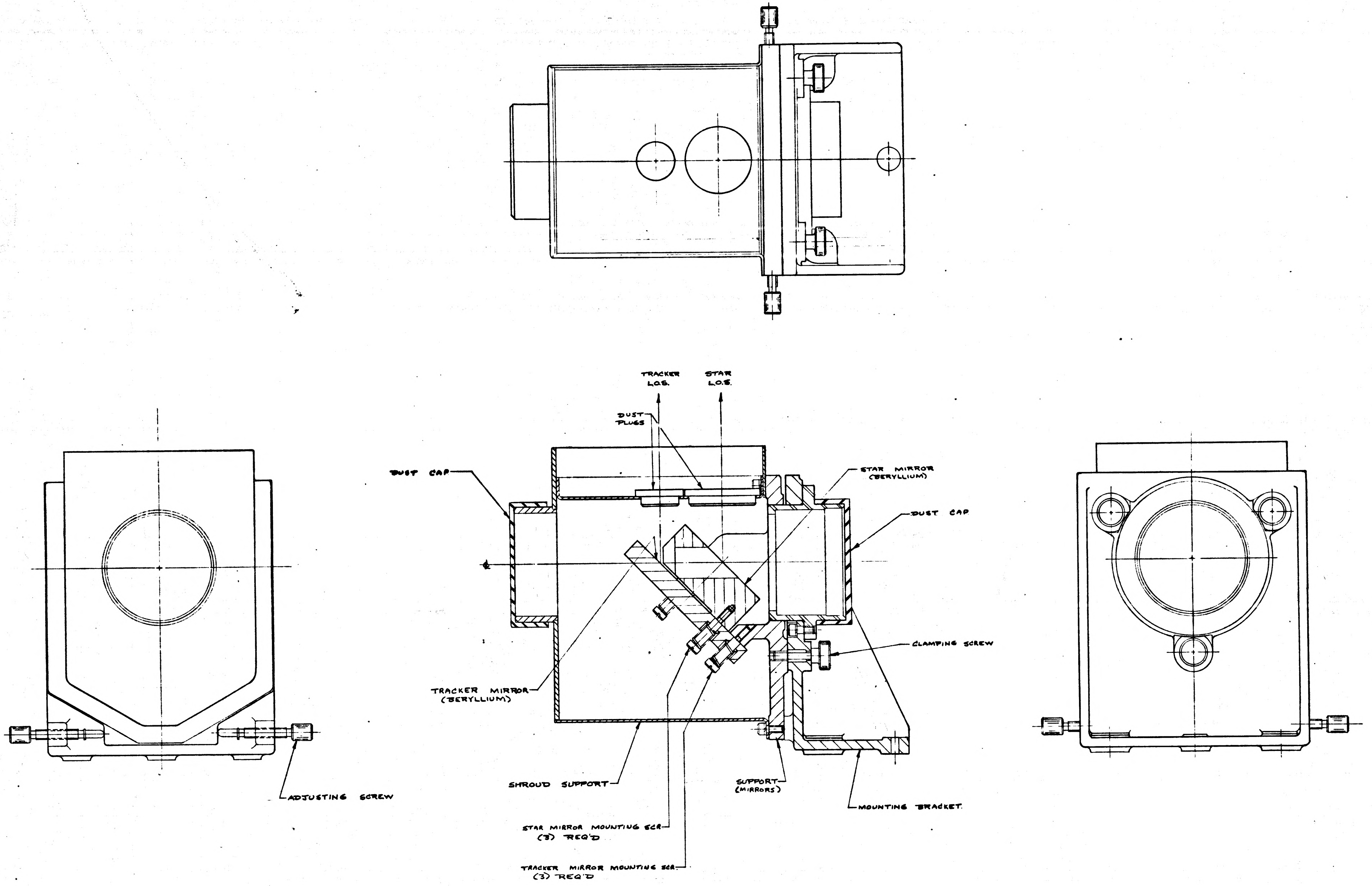
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN S. MILES DATE 2-10-65
CHECKED
APPROVAL L. MIRONOV 2-10-65
APPROVAL
NASA APPROVAL [illegible] 2-16-65
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR & HORIZON SIMULATOR
(MIRROR)
MECHANIZATION DRAWING

CODE IDENT NO.
SIZE R
NASA NUMBER 1019900
SCALE FULL
WEIGHT
CALC ACTUAL
SHEET 3 OF

JDRR 16420 2/16/65


TRACKER L.O.S.
STAR L.O.S.
DUST PLUGS
DUST CAP
STAR MIRROR (BERYLLIUM)
DUST CAP
CLAMPING SCREW
TRACKER MIRROR (BERYLLIUM)
SHROUD SUPPORT
SUPPORT (MIRRORS)
MOUNTING BRACKET
ADJUSTING SCREW
STAR MIRROR MOUNTING SCR (3) REQ'D
TRACKER MIRROR MOUNTING SCR (3) REQ'D

ITEM	QTY REQD	SYM	GOVERNMENT / NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN S. MILES DATE 2-10-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR & HORIZON SIMULATOR
(MIRROR)
MECHANIZATION DRAWING

CODE IDENT NO. | SIZE R | NASA NUMBER 1019900
SCALE FULL | WEIGHT | CALC ACTUAL | SHEET 4 OF 5

REVISIONS TORR 16420 2/16/65				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

1 SCOPE

1-1 PURPOSE. This specification establishes the requirements for the Star and Horizon Simulator.

2 DESCRIPTION. The Star and Horizon Simulator is a 2-inch Clear Aperture Refracting Autocollimator with an accessory array of reflecting mirrors to view pairs of aperture concentrically and is used to check photometric response and alignment of the Star Tracker and Horizon Sensor, which are components of the Optical Unit Assembly (OUA). The Simulator provides two variable magnitude star images and a horizon of variable intensity.

3 DESIGN CHARACTERISTICS.

3-1 GENERAL.

3-1.1 Size and Configuration. The Simulator shall incorporate a shroud to exclude all extraneous light from entering the Optics subsystem during photometric testing. It shall be portable in design and dimensioned such that it can be easily installed into holding fixtures required for Receiving and Inspection testing, Optical Subsystem testing, G & N System testing and Post Installation testing. The Simulator shall fit into a space 18 inches in length measured parallel to the SXT optical axis.

3-1.2 Mechanical Mounting. The Simulator shall have a stable means of mounting and shall be capable of withstanding bench handling as normally practiced with precision optics.

3-1.3 Star Magnitude. Variation in star magnitude and horizon intensity shall be accomplished with continuous neutral density filters.

3-1.4 Autocollimation Feature. The Simulator shall have an autocollimation feature to be used for supplemental alignment checks.

3-1.5 Power Supply. A separate regulated power supply shall be provided to support the Star and Horizon Simulator electrical requirements.

3 1.6 Dust Covers. The Simulator shall include dust covers for all exposed optics.

3-2 STAR SIMULATOR.

3-2.1 Star Simulation. The Simulation shall consist of two stars, a 6 ± 1 second star and a 30 second maximum star, both having a variable S-4 photoelectric magnitude from -0.5 to +4.0 and capable of being calibrated to an accuracy of ± 15%.

Either star shall be capable of being received simultaneously by:

a) The STLOS and the Star Tracker Photometer

b) The LLOS and the Horizon Photometer

3-2.2 Star Positioning. The Simulator shall be capable of positioning the star within a full field of 1°. It shall provide a micrometer readout for the star position to 1 arc second or better. Accuracy of this readout with respect to overall error of the Simulator shall be ± 3 arc seconds or better when using the central 20 arc minutes of the field and ± 5 arc seconds or better when using the remainder of the 60 minute field. A conversion factor from micrometer reading to arc second can be used.

3-3 HORIZON SIMULATOR.

3-3.1 Horizon Size. The Horizon Size shall be 30 arc minutes minimum.

3-3.2 Horizon Simulation. The Horizon Simulation shall have a variable intensity capable of being calibrated to ± 15% with a maximum to minimum intensity ratio of greater than 6 to 1. The 50% intensity level of an arbitrary maximum intensity shall be determined to an accuracy of 5% (when constantly monitored using a recording photometer) with a design goal of 2% accuracy. The variable intensity horizon shall be capable of being varied over the entire range in a time period of 1 minute. The Horizon Simulation shall have the same spectral content as the Star Simulation and a magnitude compatible to the horizon sensor of the OUA over the range of 6 to 1.

3-4 OPTICAL REQUIREMENTS.

3-4.1 Aperture Size. The Simulator shall have two separate folding mirror assemblies. One mirror assembly shall accommodate the needs of the Horizon Photometer and Landmark LOS measurements. The second mirror assembly shall accommodate the Tracker and Star LOS measurements.

3-4.2 Locating Device. The unit shall include means of assuring that the apertures are concentric with the corresponding apertures of the unit under test within 0.062 inches.

3-5 MECHANICAL STABILITY.

3-5.1 Stability. The unit shall remain stable to the degree necessary to meet the optical and photometric accuracy requirements as outlined in paragraphs 3 2.1, 3-2.2 and 3-3.2 for a period of 4 hours and throughout a temperature range of 72° ± 5°F.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN S. Miles DATE 2-2-65
CHECKED
APPROVAL L. Mironov -2-10-65
APPROVAL
NASA APPROVAL A.C. [illegible] 2/16/65
[illegible] 2-10-65
MIT APPROVAL W. [illegible] 16 Feb 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MECHANIZATION DRAWING
FOR
BLOCK II STAR & HORIZON SIMULATOR

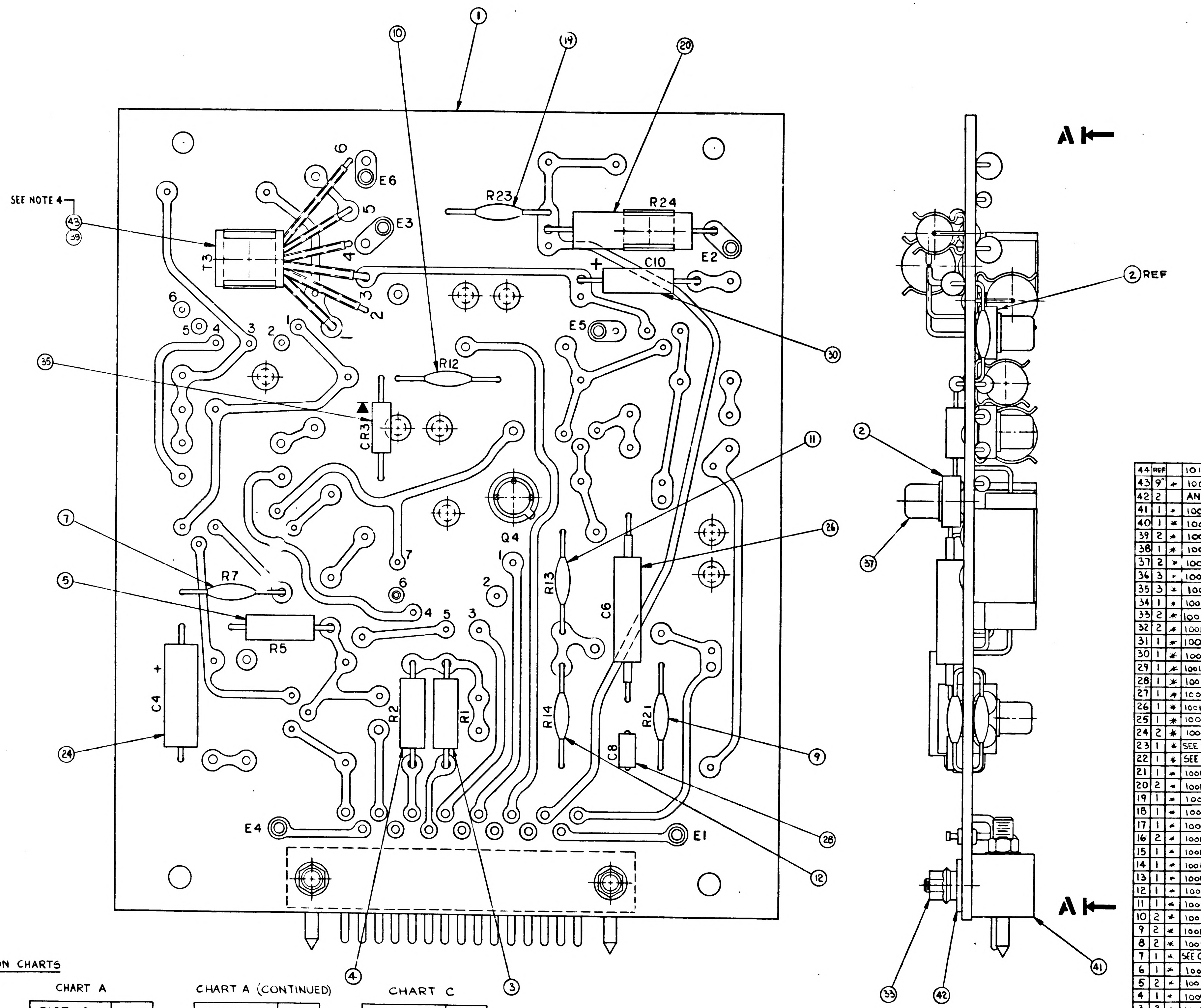
CODE IDENT NO.
SIZE C
NASA NUMBER 1019900
SCALE
WEIGHT CALC ACTUAL
SHEET 5 OF 5

WA

NOTES:
1. INTERPRET DWG PER MIL-D-70327.
2. SOLDER LEADS TO ETCHED BOARD PER ND 002071.

3. ALL DIODES AND TRANSISTORS SHALL BE SOLDERED TO BOARD UTILIZING A THERMAL SHUNT ATTACHED TO COMPONENT LEAD PER ND1002071.
4. SLEEVE T1, T2 AND T3 WITH ITEM NO. 43.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	-	CLASS A RELEASE PER TDRR 21712		
A5		REVISED PER ECC 10742 TDRR 23963 DATE 11-7-65	11-18-65	2-3-65



SELECTION CHARTS

CHART B

PART NO.	VALUE
[illegible]	1000µµF
[illegible]	2200µµF
[illegible]	3300µµF
[illegible]	4700µµF
[illegible]	5600µµF
[illegible]	6800µµF
[illegible]	8200µµF
[illegible]	10,000µµF

CHART A

PART NO.	VALUE
[illegible]	68 Ω
[illegible]	75 Ω
[illegible]	82 Ω
[illegible]	91 Ω
[illegible]	100 Ω
[illegible]	110 Ω
[illegible]	120 Ω
[illegible]	130 Ω
[illegible]	150 Ω
[illegible]	160 Ω

CHART A (CONTINUED)

PART NO.	VALUE
1001713-1	51 Ω
1001713-2	56 Ω
1001716-109	33 Ω
1001716-111	39 Ω
1001716-113	47 Ω

CHART C

PART NO.	VALUE
1001704-52	.015 UF
1001704-53	.018 UF

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
44	REF		1019898			SCHEMATIC DIAGRAM			
43	9"	*	1001710-22			INSULATION, SLEEVING			
42	2		AN960C4	74468051002		WASHER, FLAT			
41	1	*	1001760-2	68502012002		CONNECTOR, RECEPTACLE, ELECTRICAL			
40	1	*	1001718			TRANSFORMER (T2)			
39	2	*	1001733			TRANSFORMER (T1,T3)			
38	1	*	1001712-1			TRANSISTOR, SILICON, NPN (Q6)			
37	2	*	1001719-001			TRANSISTOR, SILICON, NPN (Q3, Q4)			
36	3	*	1001720-001			TRANSISTOR, SILICON, NPN (Q1, Q2, Q5)			
35	3	*	1001708			SEMICONDUCTOR DEVICE, DIODE (CR2, CR3, CR4)			
34	1	*	1001749-24			SEMICONDUCTOR DEVICE, DIODE (CR1)			
33	2	*	1001726-4	74443146002		NUT, SELF LOCKING, HEX			
32	2	*	1001723-218			CAPACITOR, FIXED, (C12, C14)			
31	1	*	1001706-15			CAPACITOR, FIXED, (C11)			
30	1	*	1001706-69			CAPACITOR, FIXED (C10)			
29	1	*	1001704-24			CAPACITOR, FIXED, (C9)			
28	1	*	1001722-17			CAPACITOR, FIXED (C8)			
27	1	*	1001706-29			CAPACITOR, FIXED, (C7)			
26	1	*	1001723-226			CAPACITOR, FIXED (C6)			
25	1	*	1001717-102			CAPACITOR, FIXED, (C5)			
24	2	*	1001706-13			CAPACITOR, FIXED (C4, C13)			
23	1	*	SEE CHART C			CAPACITOR, FIXED, (C3)			
22	1	*	SEE CHART B			CAPACITOR, FIXED, (C2)			
21	1	*	1001706-65			CAPACITOR, FIXED, (C1)			
20	2	*	1001714-8			RESISTOR, FIXED, (R24, R25)			
19	1	*	1001713-8			RESISTOR, FIXED (R23)			
18	1	*	1001716-48			RESISTOR, FIXED, (R22)			
17	1	*	1001713-78			RESISTOR, FIXED, (R20)			
16	2	*	1001713-73			RESISTOR, FIXED, (R18, R19)			
15	1	*	1001713-31			RESISTOR, FIXED, (R17)			
14	1	*	1001713-15			RESISTOR, FIXED, (R16)			
13	1	*	1001713-61			RESISTOR, FIXED (R15)			
12	1	*	1001713-57			RESISTOR, FIXED (R14)			
11	1	*	1001713-71			RESISTOR, FIXED. (R13)			
10	2	*	1001713-39			RESISTOR, FIXED, (R11, R12)			
9	2	*	1001713-43			RESISTOR, FIXED, (R9, R21)			
8	2	*	1001713-56			RESISTOR, FIXED (R8, R10)			
7	1	*	SEE CHART A			RESISTOR, FIXED, (R7)			
6	1	*	1001713-67			RESISTOR, FIXED, (R6)			
5	2	*	1001705-769			RESISTOR, FIXED, (R4, R5)			
4	1	*	1001705-68			RESISTOR, FIXED (R2)			
3	2	*	1001715-20			RESISTOR, FIXED (R1, R3)			
2	6	*	1001769	74471452001		INSULATOR DISC-TRANSISTOR MOUNTING CONVERTER			
1	1		1019903	02386910134		MOTOR DRIVE AMPLIFIER, BOARD ASSY			

-011

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019580	[illegible]

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

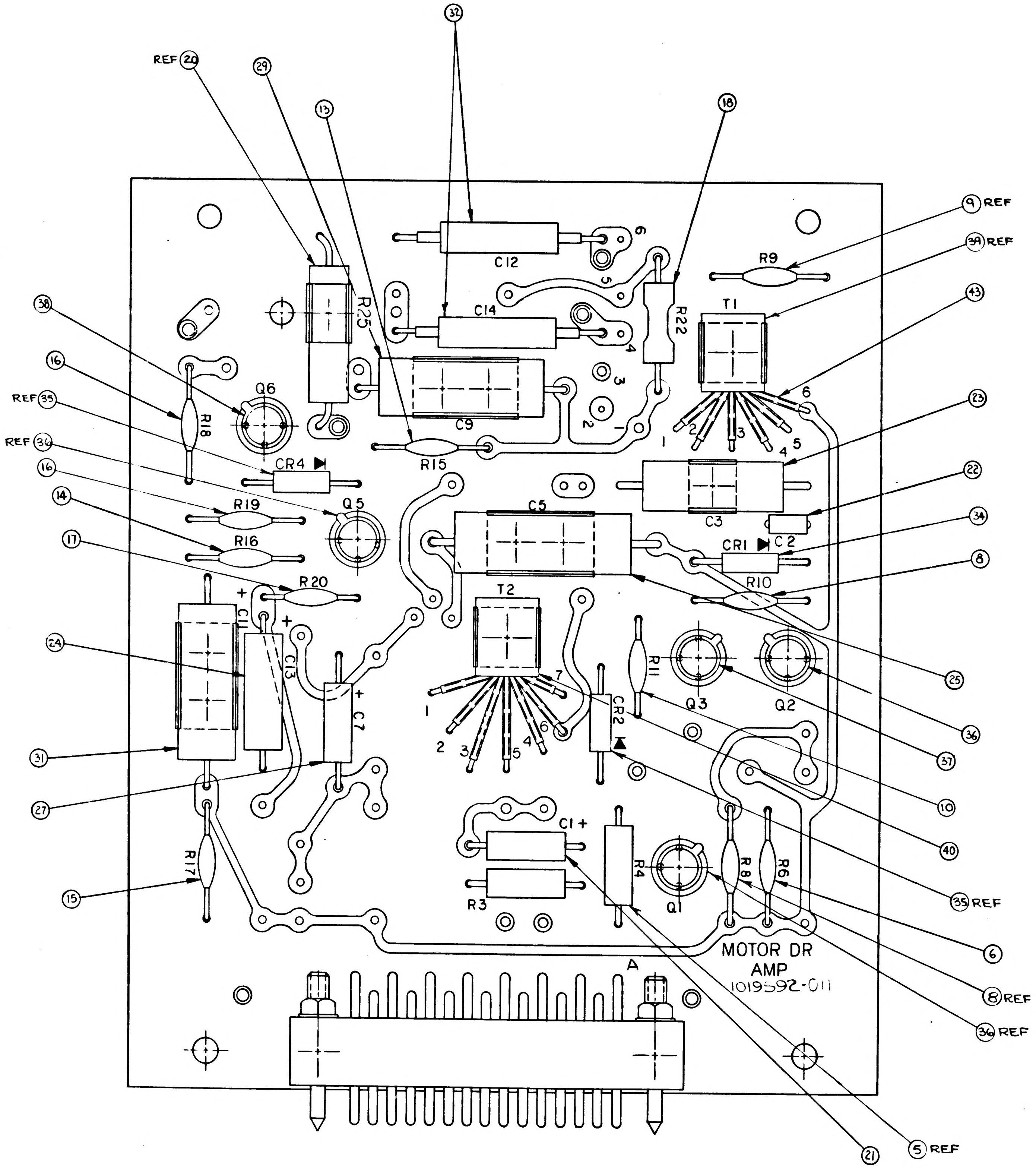
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135
DRAWN J.D. DUNN DATE 3-8-65
CHECKED 3-10-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOTOR DRIVE AMPLIFIER
SUB — ASSEMBLY

CODE IDENT NO 89944
SIZE E
NASA NUMBER 1019904
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	–	CLASS A RELEASE PER TPR 21713		
4 5		REVISED PER ECO 103424 TDRR 23963 DATE 11-3-65	[illegible]	73 12-3-65



REF 20
29
13
32
18
9 REF
39 REF
43
38
16
REF 35
REF 36
16
14
17
24
31
27
15
23
22
34
8
25
36
37
10
40
35 REF
6
8 REF
36 REF
21
5 REF
C12
C14
R25
R22
R9
T1
Q6
R18
C9
R15
CR4
R19
Q5
R16
R20
C5
C3
C2
CR1
R10
C11
C13
C7
T2
R11
CR2
Q3
Q2
C1
R4
R8
R6
R3
Q1
1
2
3
4
5
6
7
+
MOTOR DR
AMP
1019592-011
A

VIEW A A

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019880	[illegible]

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135
DRAWN D. DUNN DATE [illegible]
CHECKED [illegible] 3-26-65
APPROVAL [illegible] 4-5-[illegible]
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

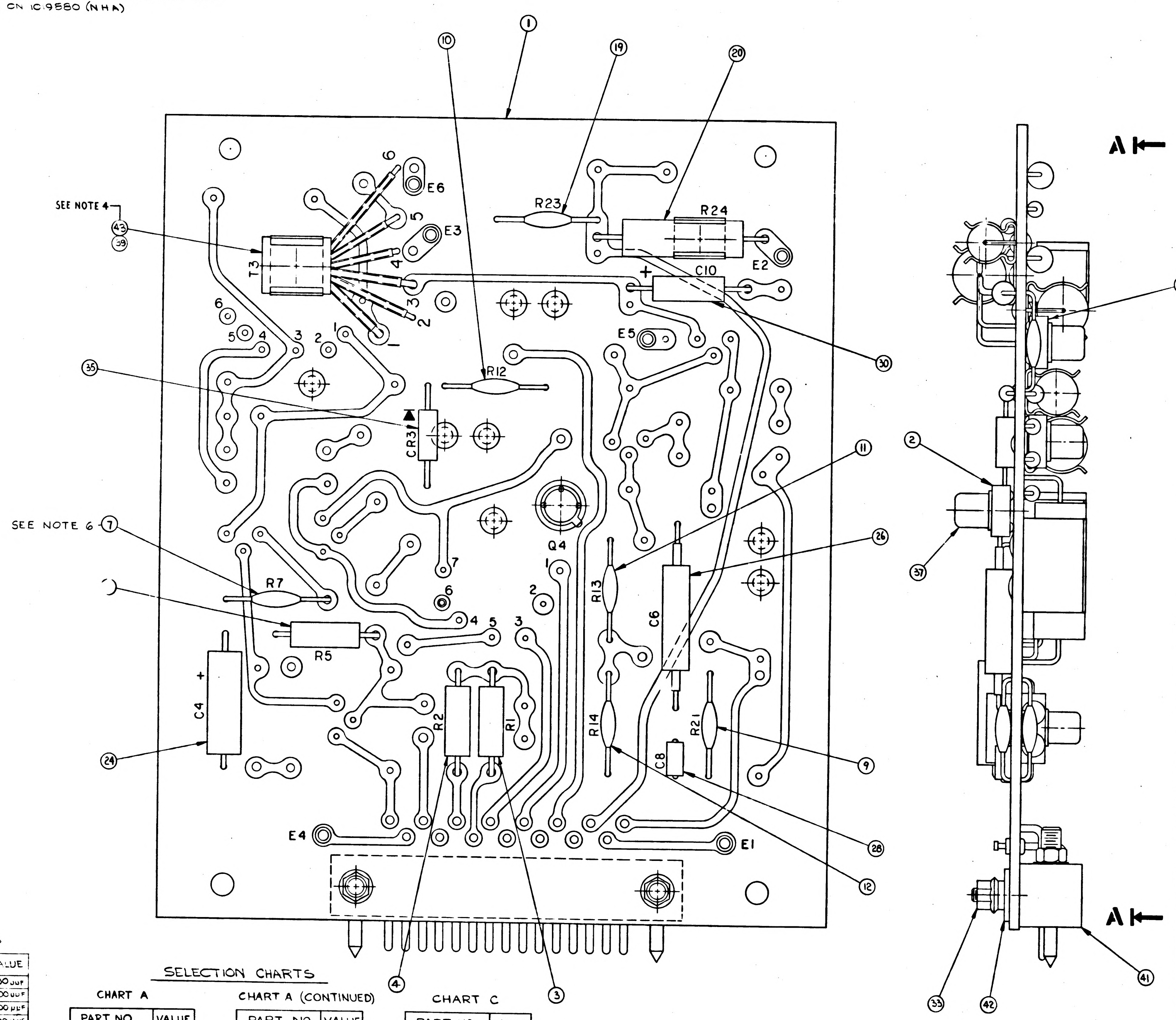
TITLE
MOTOR DRIVE AMPLIFIER
SUB-ASSEMBLY

CODE IDENT NO 39944
SIZE E
NASA NUMBER 1019904
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

NOTES:
1. INTERPRET DWG PER MIL-D-70327.
2. SOLDER LEADS TO ETCHED BOARD PER ND1002071.
3. ALL DIODES AND TRANSISTORS SHALL BE SOLDERED TO BOARD UTILIZING A THERMAL SHUNT ATTACHED TO COMPONENT LEAD PER ND1002071.
4. SLEEVE T1, T2 AND T3 WITH ITEM NO. 43.
5. CUT ITEM 43 TO PROPER LENGTH AS SHOWN IN CHART D
6. THESE COMPONENTS LISTED IN CHARTS A, B, AND C TO BE SELECTED IN ACCORDANCE WITH INSPECTION AND TEST PROCEDURES LISTED ON 1019580 (NHA)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV		CLASS A RELEASE PER TDRR 21713		
A5		REVISED PER ECO 109424 TDRR 23963 DATE 11-9-65	11-18-65	12-3-65
B5		REVISED PER ECO 114417 TDRR 25640 DATE 1/25/66	2-3-66	2-5-66



B3

CHART D
CUTTING LENGTH

LENGTH ±.030	COMPONENT PIGTAIL
.250	T1-1
.250	T1-2
.250	T1-3
.250	T1-4
.250	T1-5
.250	T1-6
.375	T2-1
.375	T2-2
.406	T2-3
.375	T2-4
.406	T2-5
.375	T2-6
.187	T3-1
.375	T3-2
.375	T3-3
.375	T3-4
.375	T3-5
.625	T3-6

CHART B

PART NO.	VALUE
1001722-7	1000 UUF
1001722-2	2200 UUF
1001722-23	3300 UUF
1001722-25	4700 UUF
1001722-26	5600 UUF
1001722-27	6800 UUF
1001722-28	8200 UUF
1001722-29	10,000 UUF
1001722-9	220 UUF
1001722-13	470 UUF
1001722-1	47 UUF
1001722-3	68 UUF
1001722-4	82 UUF
1001722-5	100 UUF

SELECTION CHARTS

CHART A

PART NO.	VALUE
1001713-4	68 Ω
1001713-5	75 Ω
1001713-6	82 Ω
1001713-7	91 Ω
1001713-8	100 Ω
1001713-9	110 Ω
1001713-10	120 Ω
[illegible]	130 Ω
1001713-12	150 Ω
1001713-13	160 Ω

CHART A (CONTINUED)

PART NO.	VALUE
1001713-1	51 Ω
1001713-2	56 Ω
1001716-109	33 Ω
1001716-111	39 Ω
1001716-113	47 Ω

CHART C

PART NO.	VALUE
1001704-52	.015 UF
1001704-53	.018 UF

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
43	9"	*	1001710-22			INSULATION, SLEEVING (SEE NOTE 5)			
42	2		AN960C4	74468051002		WASHER, FLAT			
41	1	*	1001760-2	68502012002		CONNECTOR, RECEPTACLE, ELECTRICAL			
40	1	*	1001718			TRANSFORMER (T2)			
39	2	*	1001733			TRANSFORMER (T1, T3)			
38	1	*	1001712-1			TRANSISTOR, SILICON, NPN (Q6)			
37	2	*	1001719-001			TRANSISTOR, SILICON, NPN (Q3, Q4)			
36	3	*	1001720-001			TRANSISTOR, SILICON, NPN (Q1, Q2, Q5)			
35	3	*	1001708			SEMICONDUCTOR DEVICE, DIODE (CR2, CR3, CR4)			
34	1	*	1001749-24			SEMICONDUCTOR DEVICE, DIODE (CR1)			
33	2	*	1001726-4	74443146002		NUT, SELF LOCKING, HEX			
32	2	*	1001723-218			CAPACITOR, FIXED, (C12, C14)			
31	1	*	1001706-15			CAPACITOR, FIXED, (C11)			
30	1	*	1001706-69			CAPACITOR, FIXED (C10)			
29	1	*	1001704-24			CAPACITOR, FIXED, (C9)			
28	1	*	1001722-17			CAPACITOR, FIXED (C8)			
27	1	*	1001706-29			CAPACITOR, FIXED, (C7)			
26	1	*	1001723-226			CAPACITOR, FIXED (C6)			
25	1	*	1001717-102			CAPACITOR, FIXED, (C5)			
24	2	*	1001706-13			CAPACITOR, FIXED (C4, C13)			
23	1	*	SEE CHART C			CAPACITOR, FIXED, (C3)			
22	1	*	SEE CHART B			CAPACITOR, FIXED, (C2)			
21	1	*	1001706-65			CAPACITOR, FIXED, (C1)			
20	2	*	1001714-8			RESISTOR, FIXED, (R24, R25)			
19	1	*	1001713-8			RESISTOR, FIXED (R23)			
18	1	*	1001716-48			RESISTOR, FIXED, (R22)			
17	1	*	1001713-78			RESISTOR, FIXED, (R20)			
16	2	*	1001713-73			RESISTOR, FIXED. (R18, R19)			
15	1	*	1001713-31			RESISTOR, FIXED, (R17)			
14	1	*	1001713-15			RESISTOR, FIXED, (R16)			
13	1	*	1001713-61			RESISTOR, FIXED. (R15)			
12	1	*	1001713-57			RESISTOR, FIXED. (R14)			
11	1	*	1001713-71			RESISTOR, FIXED, (R13)			
10	2	*	1001713-39			RESISTOR, FIXED, (R11, R12)			
9	2	*	1001713-43			RESISTOR, FIXED, (R9, R21)			
8	2	*	1001713-56			RESISTOR, FIXED (R8, R10)			
7	1	*	SEE CHART A			RESISTOR, FIXED, (R7)			
6	1	*	1001713-67			RESISTOR, FIXED. (R6)			
5	2	*	1001705-769			RESISTOR, FIXED, (R4, R5)			
4	1	*	1001705-68			RESISTOR, FIXED (R2)			
3	2	*	1001715-20			RESISTOR, FIXED (R1, R3)			
2	6	*	1001769	74471452001		INSULATOR DISC-TRANSISTOR MOUNTING CONVERTER			
1	1		1019903	02386910134		MOTOR DRIVE AMPLIFIER, BOARD ASSY			

-011

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019880	[illegible]349

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

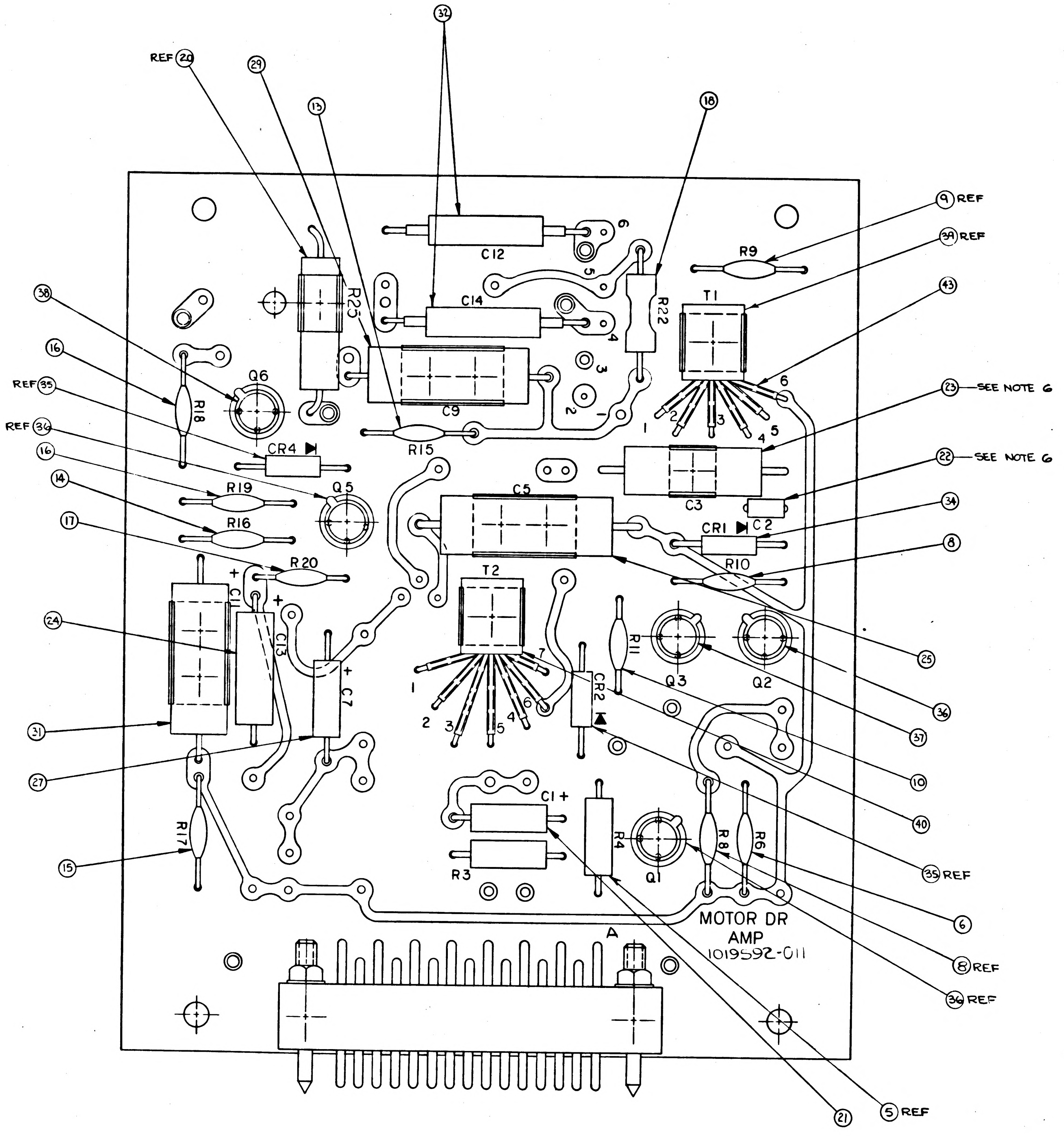
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135
DRAWN J.D. DUNN DATE 3-8-65
CHECKED [illegible] 3-[illegible]-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MOTOR DRIVE AMPLIFIER
SUB — ASSEMBLY

CODE IDENT NO 89944
SIZE E
NASA NUMBER 1019904
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	–	CLASS A RELEASE PER EPR 21713		
A5		REVISED PER ECL 109424 TDRR 23963 DATE 11-3-65	11-18-65 M.S.	12-3-65
B5		REVISED PER ECL 114417 TDRR 25640 DATE 25	RC 23	28



REF ⑳
㉙
⑬
㉜
⑱
⑨ REF
㊴ REF
㊸
㊳
⑯
REF ㉟
REF ㊱
⑯
⑭
⑰
㉓ — SEE NOTE 6
㉒ — SEE NOTE 6
㉞
⑧
㉔
㉕
㊱
㉛
㉗
㊲
⑩
㊵
㉟ REF
⑮
⑥
⑧ REF
㊱ REF
㉑
⑤ REF
C12
C14
R25
R22
T1
R9
C9
R15
Q6
R18
CR4
C3
C2
C5
CR1
R10
R19
Q5
R16
R20
T2
C11
C13
C7
R11
Q3
Q2
CR2
C1
R3
R4
Q1
R8
R6
R17
1
2
3
4
5
6
7
A
MOTOR DR
AMP
1019592-011

VIEW A A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019880	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135
DRAWN J.D. DUNN DATE 3-8-65
CHECKED 3-26-65
APPROVAL 4-5-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

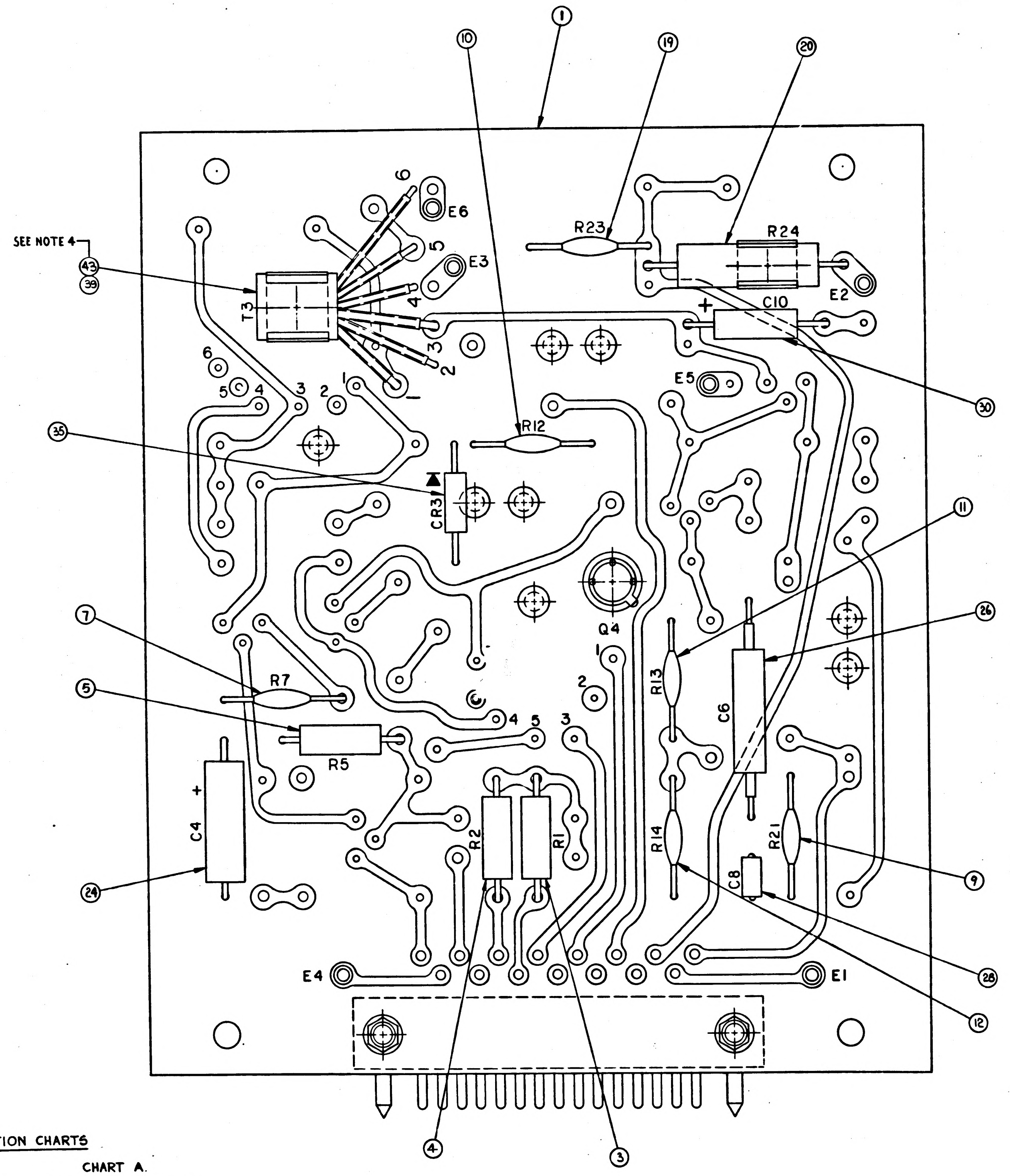
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

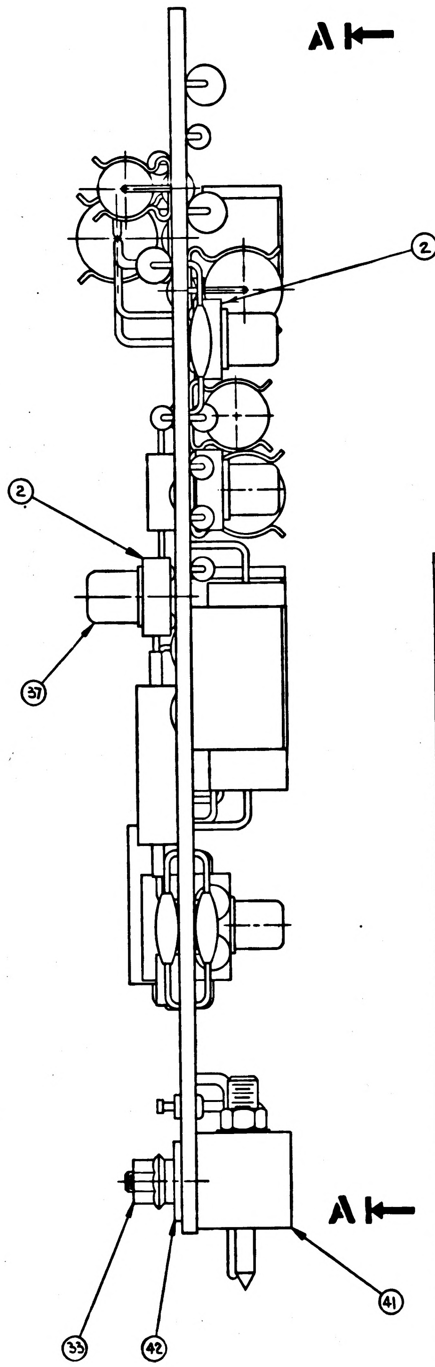
TITLE
MOTOR DRIVE AMPLIFIER
SUB-ASSEMBLY

CODE IDENT NO 39944
SIZE E
NASA NUMBER 1019904
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
REV.	-	CLASS A RELEASE PER [illegible] 21713		

NOTES:
1. INTERPRET DWG PER MIL-D-70327.
2. SOLDER LEADS TO ETCHED BOARD PER ND1002071.
3. ALL DIODES AND TRANSISTORS SHALL BE SOLDERED TO BOARD UTILIZING A THERMAL SHUNT ATTACHED TO COMPONENT LEAD PER ND1002071.
4. SLEEVE T1, T2 AND T3 WITH ITEM NO. 43.
5. REFER TO SCHEMATIC DIAGRAM 1019898.





ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
43	AR	*	1001710-22			INSULATION, SLEEVING			
42	2		AN960C4	74468051002		WASHER, FLAT			
41	1	*	1001760-2	68502012002		CONNECTOR, RECEPTACLE, ELECTRICAL			
40	1	*	1001718			TRANSFORMER (T2)			
39	2	*	1001733			TRANSFORMER (T1, T3)			
38	1	*	1001712-1			TRANSISTOR, SILICON, NPN (Q6)			
37	2	*	1001719-001			TRANSISTOR, SILICON, NPN (Q3, Q4)			
36	3	*	1001720-001			TRANSISTOR, SILICON, NPN (Q1, Q2, Q5)			
35	3	*	1001708			SEMICONDUCTOR DEVICE, DIODE (CR2, CR3, CR4)			
34	1	*	1001749-24			SEMICONDUCTOR DEVICE, DIODE, (CR1)			
33	2	*	1001726-4	74443146002		NUT, SELF LOCKING, HEX			
32	2	*	1001723-218			CAPACITOR, FIXED, (C12, C14)			
31	1	*	1001706-15			CAPACITOR, FIXED, (C11)			
30	1	*	1001706-69			CAPACITOR, FIXED (C10)			
29	1	*	1001704-24			CAPACITOR, FIXED, (C9)			
28	1	*	1001722-17			CAPACITOR, FIXED (C8)			
27	1	*	1001706-29			CAPACITOR, FIXED, (C7)			
26	1	*	1001723-226			CAPACITOR, FIXED (C6)			
25	1	*	1001717-102			CAPACITOR, FIXED, (C5)			
24	2	*	1001706-13			CAPACITOR, FIXED (C4, C13)			
23	1	*	1001704-53			CAPACITOR, FIXED, (C3)			
22	1	*	SEE CHART B			CAPACITOR, FIXED, (C2)			
21	1	*	1001706-65			CAPACITOR, FIXED, (C1)			
20	2	*	1001714-8			RESISTOR, FIXED, (R24, R25)			
19	1	*	1001713-8			RESISTOR, FIXED (R23)			
18	1	*	1001716-48			RESISTOR, FIXED, (R22)			
17	1	*	1001713-78			RESISTOR, FIXED, (R20)			
16	2	*	1001713-73			RESISTOR, FIXED, (R18, R19)			
15	1	*	1001713-31			RESISTOR, FIXED, (R17)			
14	1	*	1001713-15			RESISTOR, FIXED, (R16)			
13	1	*	1001713-61			RESISTOR, FIXED, (R15)			
12	1	*	1001713-57			RESISTOR, FIXED, (R14)			
11	1	*	1001713-71			RESISTOR, FIXED, (R13)			
10	2	*	1001713-39			RESISTOR, FIXED, (R11, R12)			
9	2	*	1001713-43			RESISTOR, FIXED, (R9, R21)			
8	2	*	1001713-56			RESISTOR, FIXED. (R8, R10)			
7	1	*	SEE CHART A			RESISTOR, FIXED, (R7)			
6	1	*	1001713-67			RESISTOR, FIXED, (R6)			
5	2	*	1001705-769			RESISTOR, FIXED, (R4, R5)			
4	1	*	1001705-681			RESISTOR, FIXED (R2)			
3	2	*	1001715-20			RESISTOR, FIXED (R1, R3)			
2	6	*	1001769	74471452001		INSULATOR DISC-TRANSISTOR MOUNTING CONVERTER			
1	1		1019903	02386910134		MOTOR DRIVE AMPLIFIER, BOARD ASSY			
	-011	LIST OF PARTS AND MATERIALS							

SELECTION CHARTS

CHART B

PART NO.	VALUE
[illegible]	1000 µµF
[illegible]	2200 µµF
[illegible]	3300 µµF
[illegible]	4700 µµF
[illegible]	5600 µµF
[illegible]	6800 µµF
[illegible]	8200 µµF
[illegible]	10,000 µµF

CHART A.

PART NO.	VALUE
1001713-4	68 Ω
1001713-5	75 Ω
1001713-6	82 Ω
1001713-7	91 Ω
1001713-8	100 Ω
1001713-9	110 Ω
1001713-10	120 Ω
1001713-11	130 Ω
1001713-12	150 Ω
1001713-13	160 Ω

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING

MASTER

NEXT ASSY	USED ON
1019880	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135
DRAWN J.D. DUNN DATE 3-8-65
CHECKED 3-26-65
APPROVAL 4-5-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

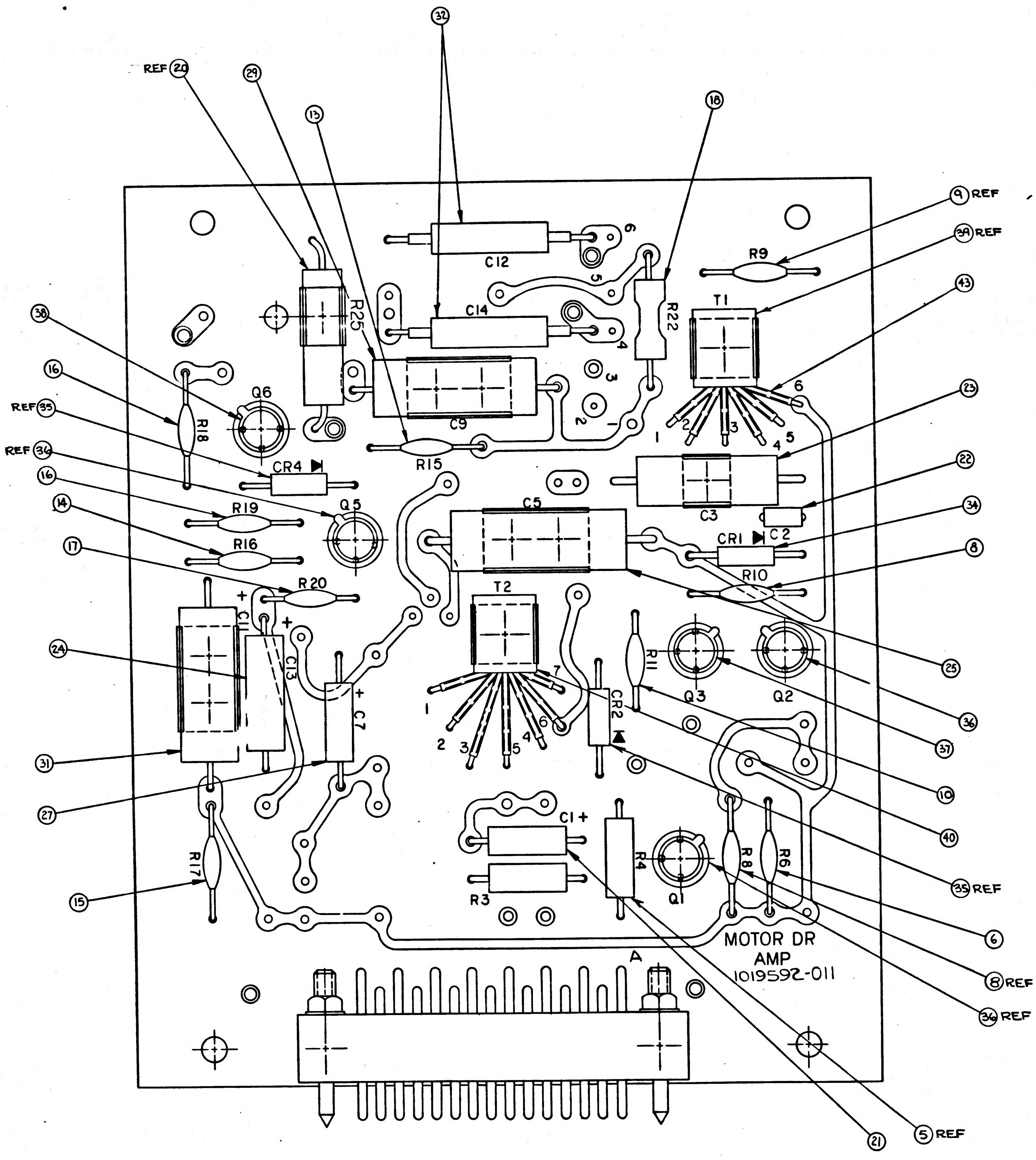
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE MOTOR DRIVE AMPLIFIER, SUB - ASSEMBLY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019904
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

1019904

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV.	–	CLASS A RELEASE PER EPR 21713		



REF ⑳
㉙
⑬
㉜
⑱
⑨ REF
㊴ REF
㊸
㊳
⑯
REF ㉟
REF ㊱
⑯
⑭
⑰
㉓
㉒
㉞
⑧
㉕
㊱
㊲
⑩
㊵
㉟ REF
⑥
⑧ REF
㉞ REF
⑤ REF
㉑
㉔
㉛
㉗
⑮
C12
C14
R25
R22
T1
R9
Q6
R18
C9
R15
CR4
C3
C5
R19
Q5
R16
CR1
C2
R10
R20
T2
C11
C13
C7
R11
Q3
Q2
CR2
C1
R4
R8
R6
R17
R3
Q1
MOTOR DR AMP 1019592-011
A

VIEW A A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

1019880	1016949
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910135

DRAWN J.D. DUNN DATE 3-8-65
CHECKED Emil O. Mane 3-26-65
APPROVAL 4-5-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE MOTOR DRIVE AMPLIFIER
SUB-ASSEMBLY

CODE IDENT NO.	SIZE	NASA NUMBER
89944	E	1019904

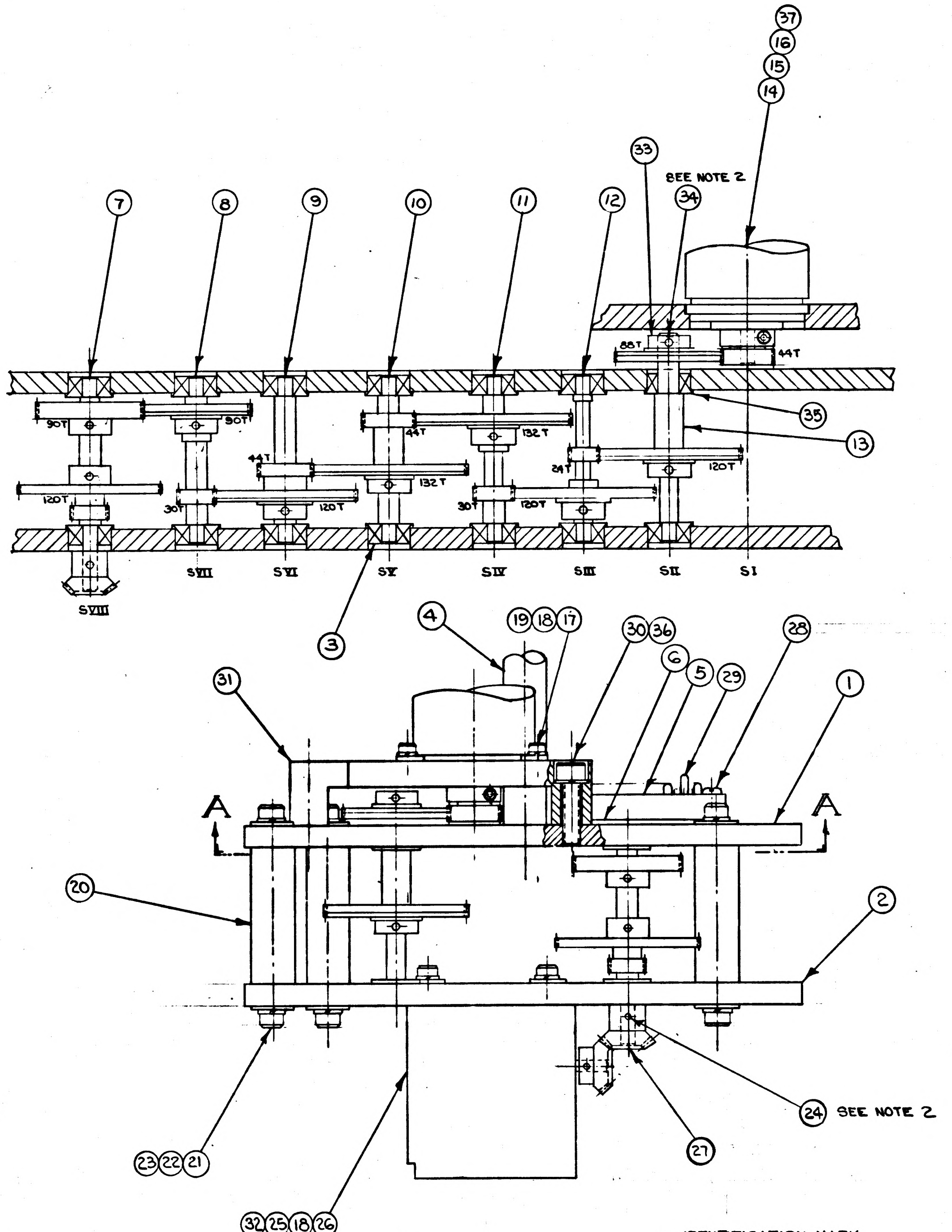
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

1019904

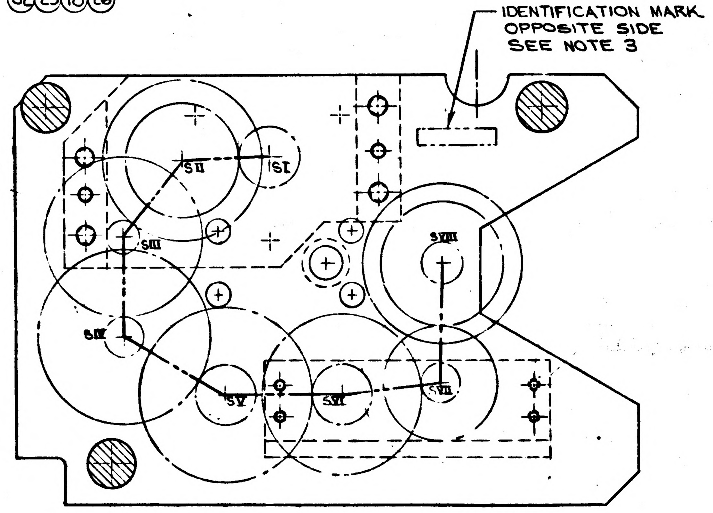
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REV	—	CLASS A RELEASE PER TDRR 21713		

NOTES:

1. INTERPRET DWG PER MIL-D-70327.
2. -DR NO. 55(.052), THRU, REAM FOR ITEM NO. 34.
3. -IDENTIFY USING NASA DRAWING NUMBER, REV LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
4. - SCHEMATIC DIAGRAM 1022956
5. - WIRE PER ND 1002032



WIRING LEGEND		
FROM RESOLVER	TO TERMINAL BOARD	
BI-RED (P1)	TB1-1	TWIST
BI-BLK (P3)	TB1-2	
BI-YEL (P2)	TB1-3	TWIST
BI-BLU (P4)	TB1-4	
BI-RED (S1)	TB1-5	
BI-YEL (S2)	TB1-6	TWIST
BI-BLK (S3)	TB1-7	



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
37	3		NAS1352C02-4			SCREW, CAP, MACH. SOC. HD.			
36	4		MS35337-80	74439050004		WASHER, LOCK, SPLIT			
35	1	*	1001728-10	03386900974		BEARING, BALL			
34	1	*	1017426-19	73002305020		PIN, PLAIN, TAPER			
33	1		1019707-011	17020110290		CLUSTER ASSY, GEAR (S2)			
32	4		AN960C-3	7446805 1001		WASHER, FLAT			
31	1		1019976-011	02386910279		PLATE, MOUNTING ASSY			
30	4		MS16995-27			SCREW, CAP, SOC. HD. HEX.			
29	7		MS25036-43	68101002309		TERMINAL, LUG, INSULATED			
28	4		MS35233-5	74455054005		SCREW, MACH, PAN HD.			
27	1		1019031	16020110200		GEAR, BEVEL, STRAIGHT (24T/48P)			
26	1		1017405-011	17020110180		ANGLE COUNTER, ASSY OF			
25	4		NAS1352C02-6			SCREW, CAP, MACH, SOC HD.			
24	1	*	1017426-18	73002305011		PIN, PLAIN, TAPER			
23	6		NAS1352C06-8			SCEW, CAP, MACH, SOC HD.			
22	6		AN960C-6	74468051003		WASHER, FLAT			
21	6		MS35337-79	74439050003		WASHER, LOCK, SPLIT			
20	3		1019075	16020110640		POST			
19	3		NAS1351C02-4			SCREW, MACHINE, SOC. HD. HEX.			
18	7		MS35337-77	74439050001		WASHER, LOCK, SPLIT			
17	3		1011868-3	54386900332		CLAMP, SYNCH.			
16	1		1019068	16020110560		GEAR, SPUR, SPLIT HUB			
15	1		1019035	16020110240		CLAMP, COLLAR			
14	1	*	1001801	03386911054		RESOLVER			
13	1		1019968-011	02386910278		CLUSTER ASSY, GEAR (SII)			
12	1		1019704	17020110260		CLUSTER ASSY, GEAR (SIII)			
11	1		1019710	17020110320		CLUSTER ASSY, GEAR (SIV)			
10	1		1019714	17020110360		CLUSTER ASSY, GEAR (SV)			
9	1		1019709	17020110310		CLUSTER ASSY, GEAR (SVI)			
8	1		1019974-011	02386910228		CLUSTER ASSY, GEAR (SVII)			
7	1		1019975-011	02386910229		CLUSTER ASSY, GEAR (SVIII)			
6	1		1019085-6	74447019006		STRIP, MARKER			
5	1	*	1017485-6	68102002406		TERMINAL BOARD			
4	1		1022125	03386911047		POST			
3	13	*	1001728-15	03386900974		BEARING, BALL			
2	1		1019022	16020110110		PLATE, GEAR (LOWER)			
1	1		1022128	03386911062		PLATE, GEAR (UPPER)			
	-011								

LIST OF PARTS AND MATERIALS

* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

NEXT ASSY	USED ON
1017389	1016949

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910277
DRAWN J. CARDILE DATE 3-25-65
CHECKED H. BRILL 3-26-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

02386910277 MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

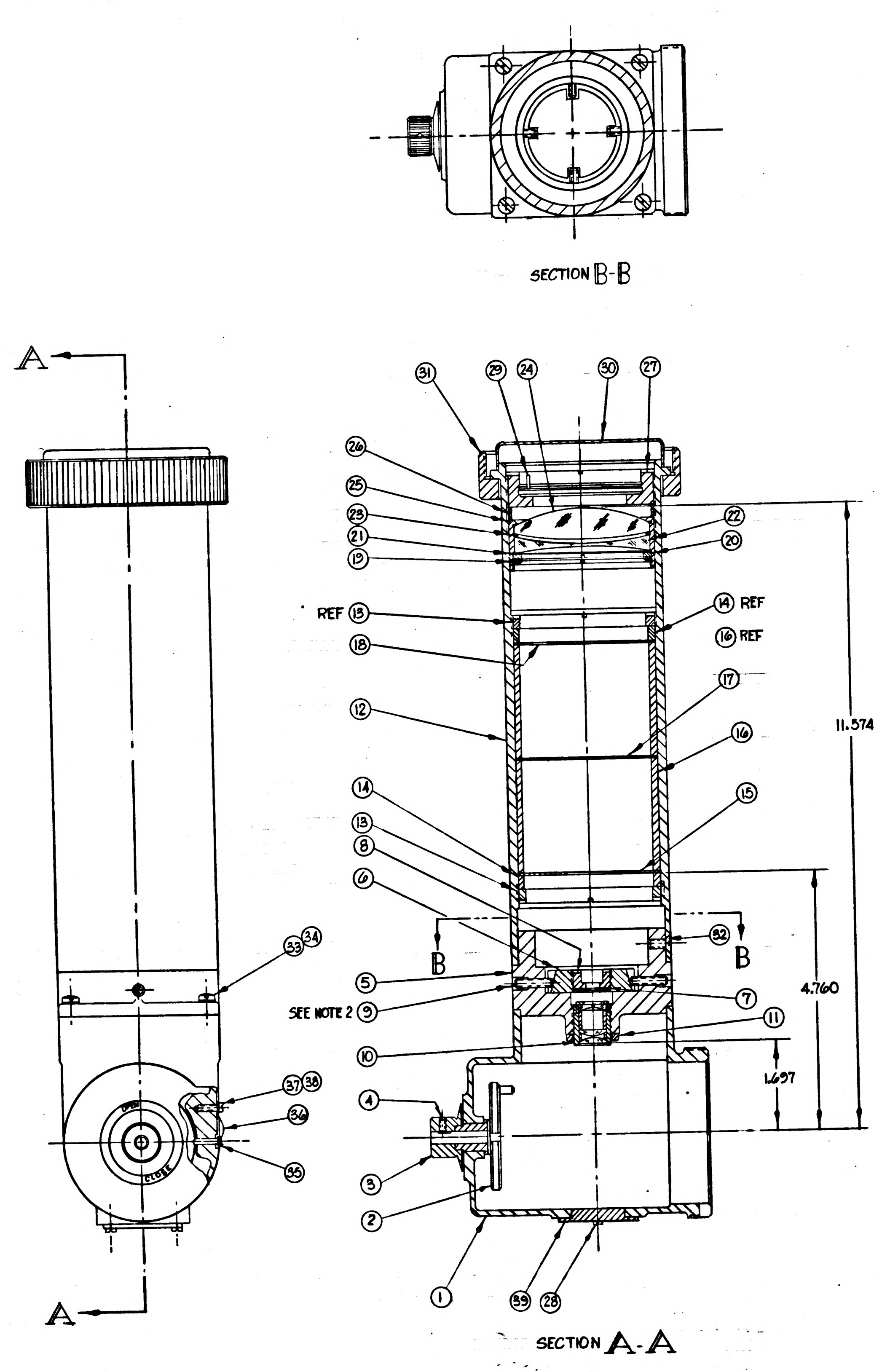
TITLE
INDICATOR ANGLE
ASSY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019907
SCALE 2:1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

MASTER

REVISIONS TDC 1860				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. ITEM NUMBERS 9 AND 32 ARE TO BE BLACKENED PER MIL-C-13924 CLASS 3
3. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
4. APERTURE DISC TO BE CENTERED WITHIN 1 MINUTE OF OPTICAL CENTER



SECTION B-B

SECTION A-A

SEE NOTE 2 — 32

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
39	1		1019471	17000009724		CAP, HOUSING			
38	1		MS352[illegible]	74455050013		SCREW, MACHINE, FIL HD			
37	1		MS353[illegible]-78	74439050002		LOCKWASHER			
36	1		1019459	17000010480		SPRING, LEAF			
35	1		1019458	17000010479		PIN, STRAIGHT, HEADED			
34	4		MS35275-31	74455050031		SCREW, MACHINE FIL HD			
33	4		MS35337-79	739050003		LOCKWASHER			
32	3		MS35249-36	74455052036		SCREW, MACHINE, FLAT HD (BLACKEN)			
31	1		1019457	17000010384		NUT, COUPLING			
30	1		1019472	17000009714		CAP, LENS			
29	1		1019463	17000009750		RING, RETAINING			
28	2		MS35233-13	74455054013		SCREW, MACHINE, PAN HD.			
27	1		1019464	17000009705		RING, EXTERNALLY THREADED			
26	1		1019461	17000009713		RING, LOCKING			
25	1		1019476	17000010631		CELL, OPTICAL ELEMENT			
24	1		1019509	17000010632		LENS, OPTICAL INSTRUMENT, OBJECTIVE			
23	1		1019462	17000010633		SPACER, OPTICAL LENS			
22	1		1019510	17000010637		LENS, OPTICAL INSTRUMENT, OBJECTIVE			
21	1		1019460	17000010635		STOP, OPTICAL			
20	1		1019466	17000010636		NUT PLAIN ROUND			
19	1		1019465	17000010639		NUT, PLAIN ROUND			
18	1		1019467	17000009719		SPACER, OPTICAL			
17	1		1019468	17000009720		SPACER, OPTICAL			
16	2		1019469	17000009722		SPACER			
15	1		1019488	17000009721		SPACER, OPTICAL			
14	2		1019481	17000009723		SPACER			
13	2		1019477	17000009718		RING, LOCKING			
12	1		1019473	17000009698		TUBE LENS			
11	1		1019487	45343400050		NUT, PLAIN ROUND			
10	1		1019937-011	85343900300		CELL, OPTICAL ELEMENT, ASSY			
9	4		MS51981-73			SETSCREW-HEX SOCKET (BLACKE			
8	1		1019455	17000009716		RETAINER, APERTURE			
7	1		1019470	17000010982		APERTURE			
6	1		1019483	17000009717		HOLDER APERTURE			
5	1		1019491	17000010494		HOUSING, CONDENSER CELL (MACH)			
4	2		MS51031-17			SETSCREW-HEX SOCKET			
3	1		1019482	17000010475		KNOB			
2	1		1019936-011	17700004259		SHAFT, DETENT, ASSY			
1	1		1019938-011	17700004256		HOUSING, PHOTOELECTRIC CELL ASSY OF			
	-011								

LIST OF PARTS AND MATERIALS

1019944	1019970	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~ DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 17700004265
NEXT ASSY	USED ON	MATERIAL —	DRAWN E.J. ROHL DATE 11-24-64 CHECKED T. Lamuitz 3-17-65 APPROVAL 3-31-65 APPROVAL
APPLICATION		CONTRACT	NASA APPROVAL 4/4/65 MIT APPROVAL 4/1/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS HOUSING, PHOTOCELL
ADAPTER, ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
89944	E	1019908
SCALE 1:1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

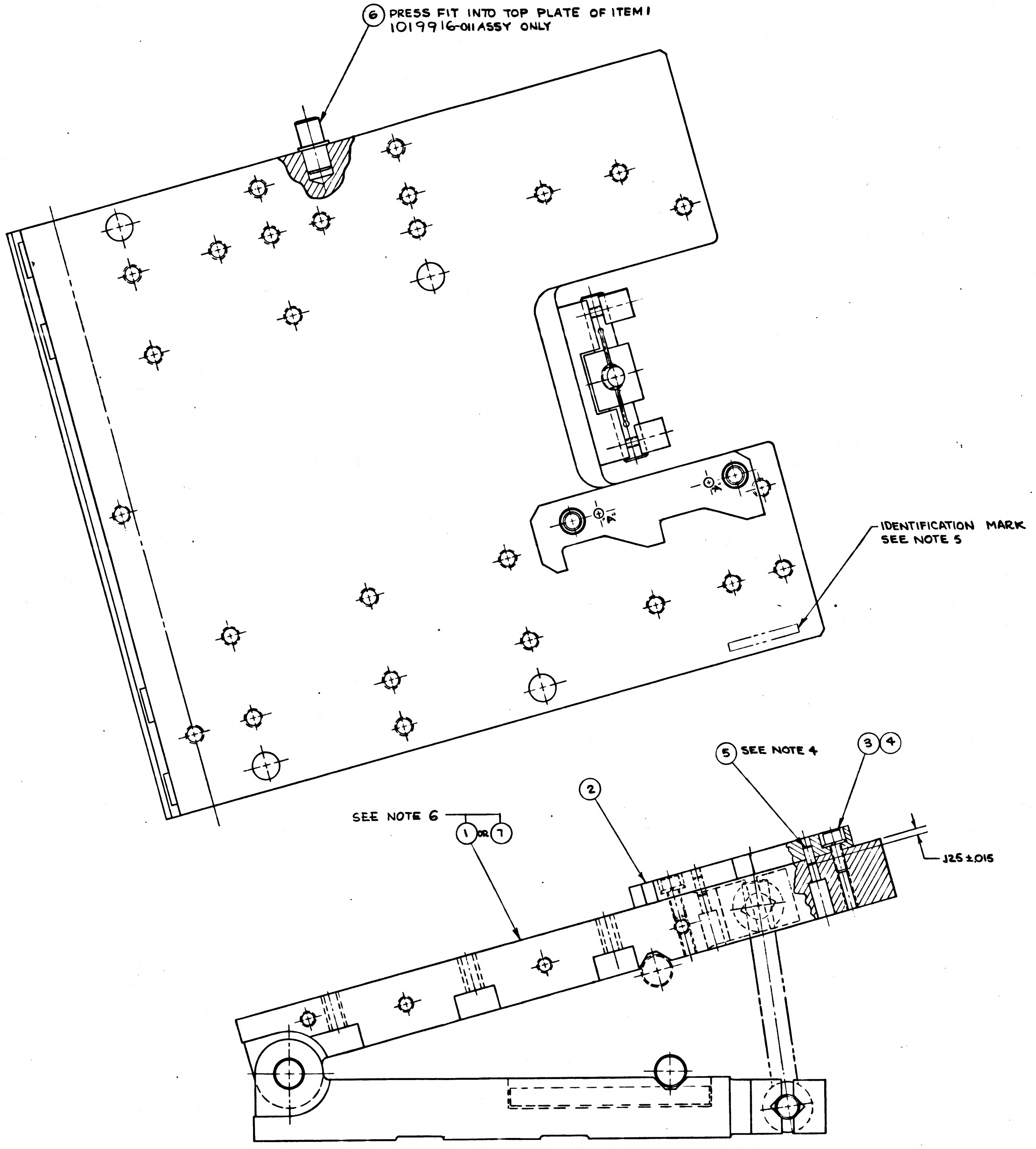
1019908

MASTER

REVISIONS [illegible] 5/28/65				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-

1- INTERPRET DWG PER MIL-D-70327
2- GENERAL MACHINING STANDARDS PER ND1002078
3- REMOVE BURRS PER ND1002079
4- DR AND REAM .1882 $^{+.0005}_{-.0000}$ DIA $\overset{32}{\vee}$ THRU ITEM ① USING ITEM ② AS TEMPLATE. HOLES IN ITEM ② TO REMAIN .1865 $^{+.0005}_{-.0000}$ DIA. PRESS FIT ITEM ⑤ INTO ITEM ② TO DIM SHOWN TWO PLACES MARKED "A"
5- IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019
6- GAGE BOX SUPPLIED AS PART OF ITEM 1 OR 7



⑥ PRESS FIT INTO TOP PLATE OF ITEM 1 1019916-011 ASSY ONLY
IDENTIFICATION MARK SEE NOTE 5
A
A
⑤ SEE NOTE 4
③ ④
②
SEE NOTE 6
① OR ⑦
.125±.015

QTY REQD	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	7	–		1001777-2	02386910274		MICRO SINE PLATE ASSY			
–	6	1		1022156	03386910162		PIN, PIVOT			
1	5	2		1017415-72	73002105108		PIN, DOWEL			
1	4	2		1017479-33	74455059018		SCREW, CAP, SOCKET HD			
1	3	2		MS35337-82	74439050006		WASHER, LOCK			
1	2	1		1019597	03386910848		PLATE, STOP			
–	1	1		1001777-1	02386910273		MICRO SINE PLATE ASSY			
-021		-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
1019926	1019926
1022824	1019962

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0238691 0240 0241

DRAWN H.EBOLD DATE 3-30-65
CHECKED S. Sams 4-10-65
APPROVAL [illegible] 4-10-65
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

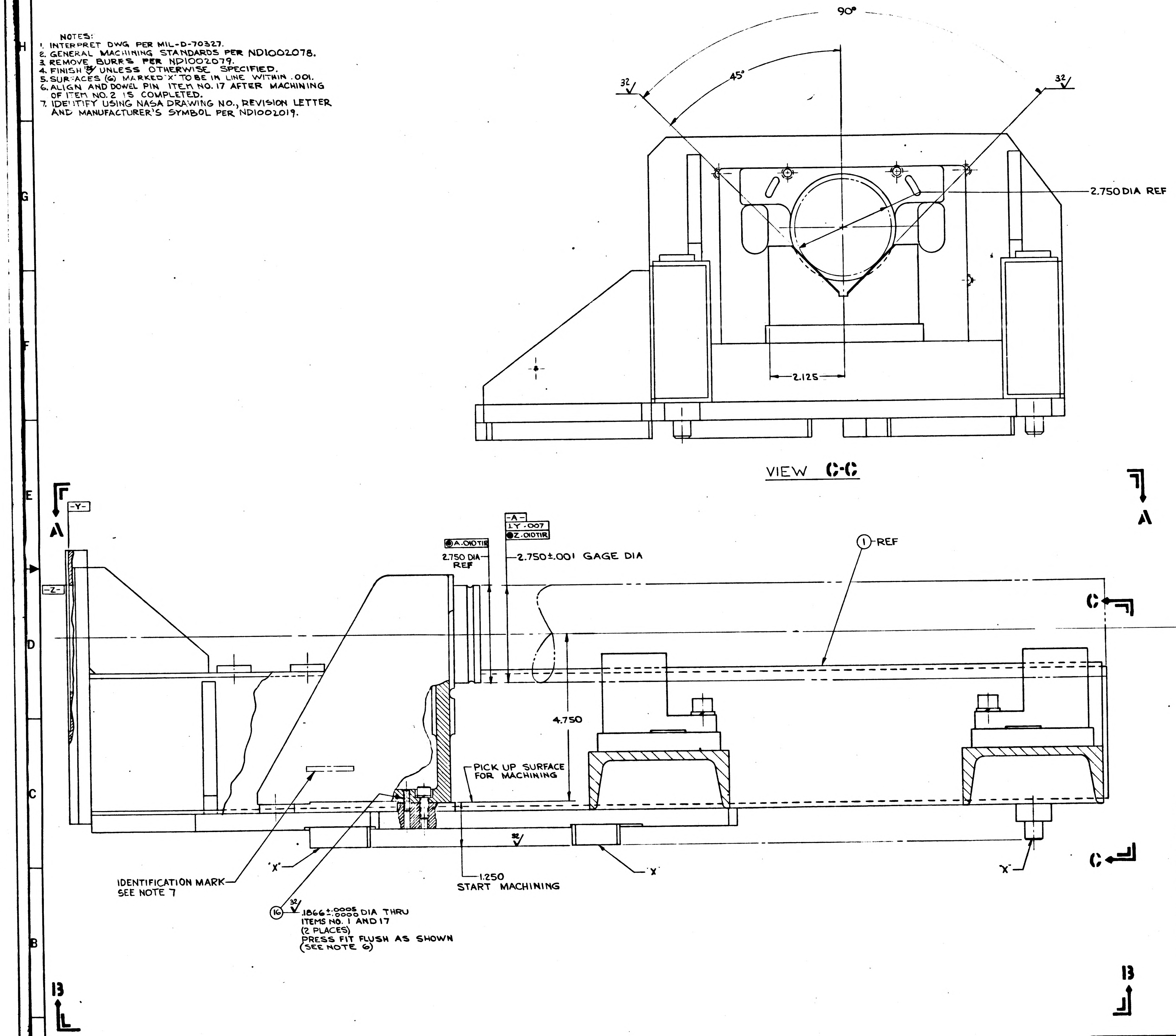
TITLE
ELEVATION PLATE ASSY,
ADJUSTABLE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019916
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019916

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG PER MIL-D-70327.
2. GENERAL MACHINING STANDARDS PER ND1002078.
3. REMOVE BURRS PER ND1002079.
4. FINISH 125√ UNLESS OTHERWISE SPECIFIED.
5. SURFACES (6) MARKED "X" TO BE IN LINE WITHIN .001.
6. ALIGN AND DOWEL PIN ITEM NO. 17 AFTER MACHINING OF ITEM NO. 2 IS COMPLETED.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.


90°
45°
32√
32√
2.750 DIA REF
2.125
VIEW C-C
A
-Y-
-Z-
-A-
⊥Y .007
● Z .010TIR
◉ A .010TIR
2.750 DIA REF
2.750±.001 GAGE DIA
① REF
C
4.750
PICK UP SURFACE FOR MACHINING
32√
"X"
"X"
"X"
1.250
START MACHINING
IDENTIFICATION MARK SEE NOTE 7
⑯ 32√ .1866 +.0005 -.0000 DIA THRU
ITEMS NO. 1 AND 17
(2 PLACES)
PRESS FIT FLUSH AS SHOWN
(SEE NOTE 6)
C
B
B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
17	1		1022123	03386910801		SUPPORT, MIRROR MOUNT (MACHINING)			
16	2		1017415-75	73002105111		PIN, DOWEL			
15	4		1017415-85	73002105129		PIN, DOWEL			
14	1		1019578	03386910842		BUSHING			
13	2		1022203	03386911065		PIN			
12	2		1017415-119	73002105177		PIN, DOWEL			
11	19		MS16995-49	74455058033		SCREW, CAP SOCKET HD			
10	19		MS35337-82	74439050006		WASHER, LOCK, SPLIT			
9	1		1019577	03386910841		PAD, MOUNTING			
8	1		1019576	03386910840		PAD, MOUNTING			
7	1		1019575	03386910839		PAD, MOUNTING			
6	1		1019574	03386910838		PAD, MOUNTING			
5	8		1017415-73	73002105109		PIN, DOWEL			
4	6		MS16995-82	74455058058		SCREW, CAP, SOCKET HD			
3	6		MS35337-84	74439050008		WASHER, LOCK, SPLIT			
2	2		1022121	03386910949		BLOCK, SUPPORT, COLLIMATOR			
1	1		1019573	03386910837		PLATFORM, SLIDING (WELDMENT)			

	-011	LIST OF PARTS AND MATERIALS

1019919

NEXT ASSY	USED ON
1019962	1019962
1019926	1019926

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

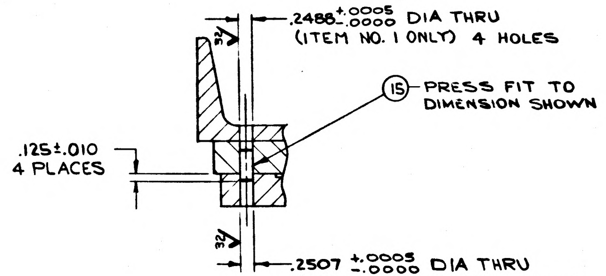
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910244
DRAWN M. SCHORR DATE 3-25-65
CHECKED S. Sum 4-14-65
APPROVAL 4-15-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

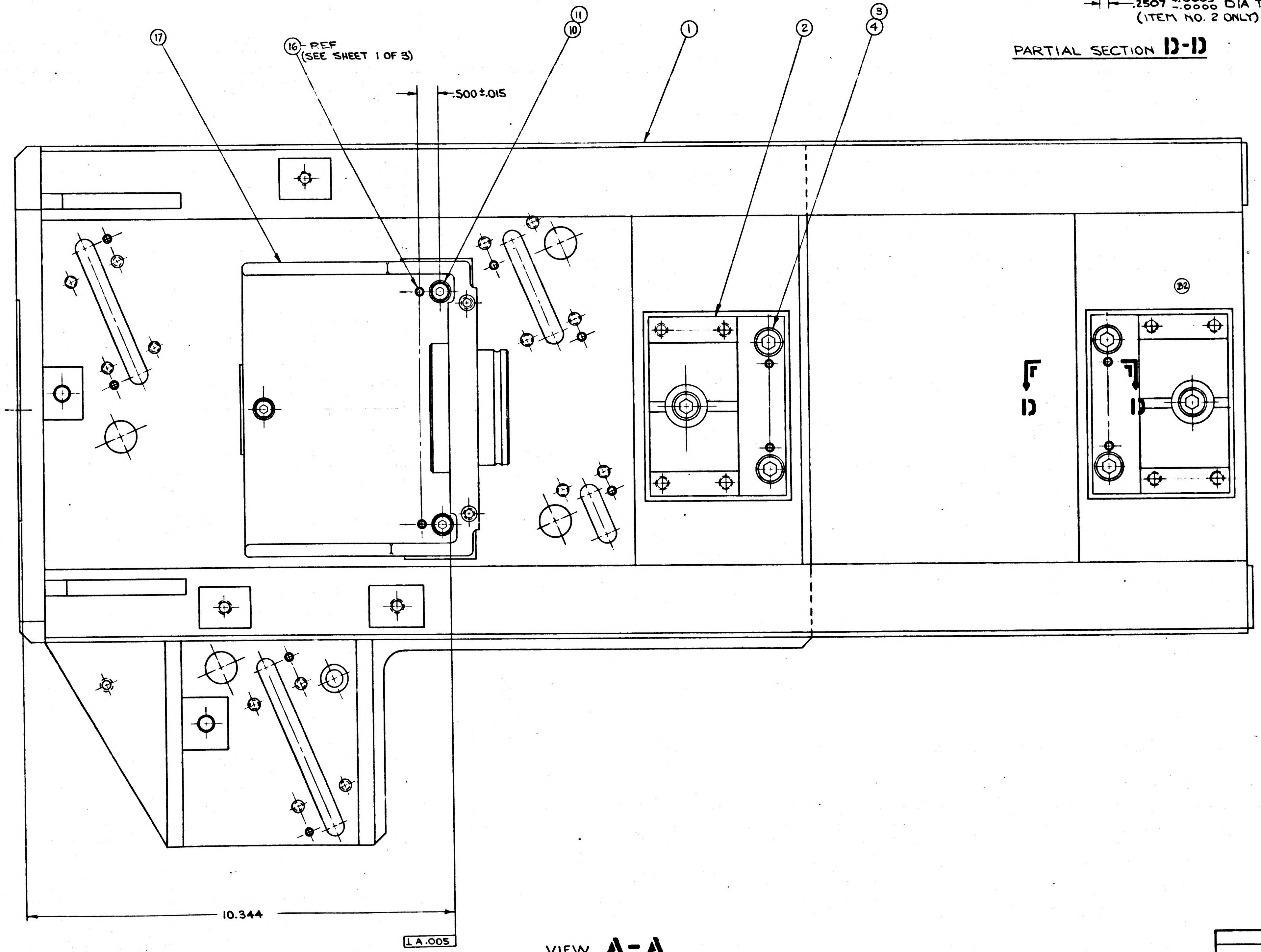
TITLE
PLATFORM, SLIDING, ASSY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019919
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


.2488 +.0005 -.0000 DIA THRU
(ITEM NO. 1 ONLY) 4 HOLES
32
15
PRESS FIT TO DIMENSION SHOWN
.125±.010
4 PLACES
32
.2507 +.0005 -.0000 DIA THRU
(ITEM NO. 2 ONLY) 4 HOLES

PARTIAL SECTION D-D


17
16 REF
(SEE SHEET 1 OF 3)
11
10
1
2
3
4
.500±.015
32
F
D
D
10.344
1 A .005

VIEW A-A

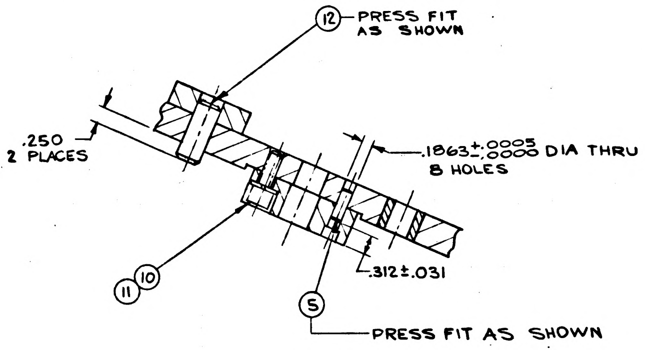
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
1019962	1019962	TOL ON FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°	KIC PN 02386910244	TITLE PLATFORM SLIDING ASSY
1019926	1019926	DO NOT SCALE THIS DRAWING	DRAWN M.SCHORR DATE 3-25-65	CODE IDENT NO. 89944
APPLICATION		MATERIAL	CHECKED S. S[illegible] 4-14-65	SIZE E
		CONTRACT	APPROVAL [illegible]	NASA NUMBER 1019919
			APPROVAL	SCALE 1/1
			NASA APPROVAL [illegible] 6/1/65	WEIGHT CALC ACTUAL
			MIT APPROVAL [illegible]	SHEET 2 OF 3

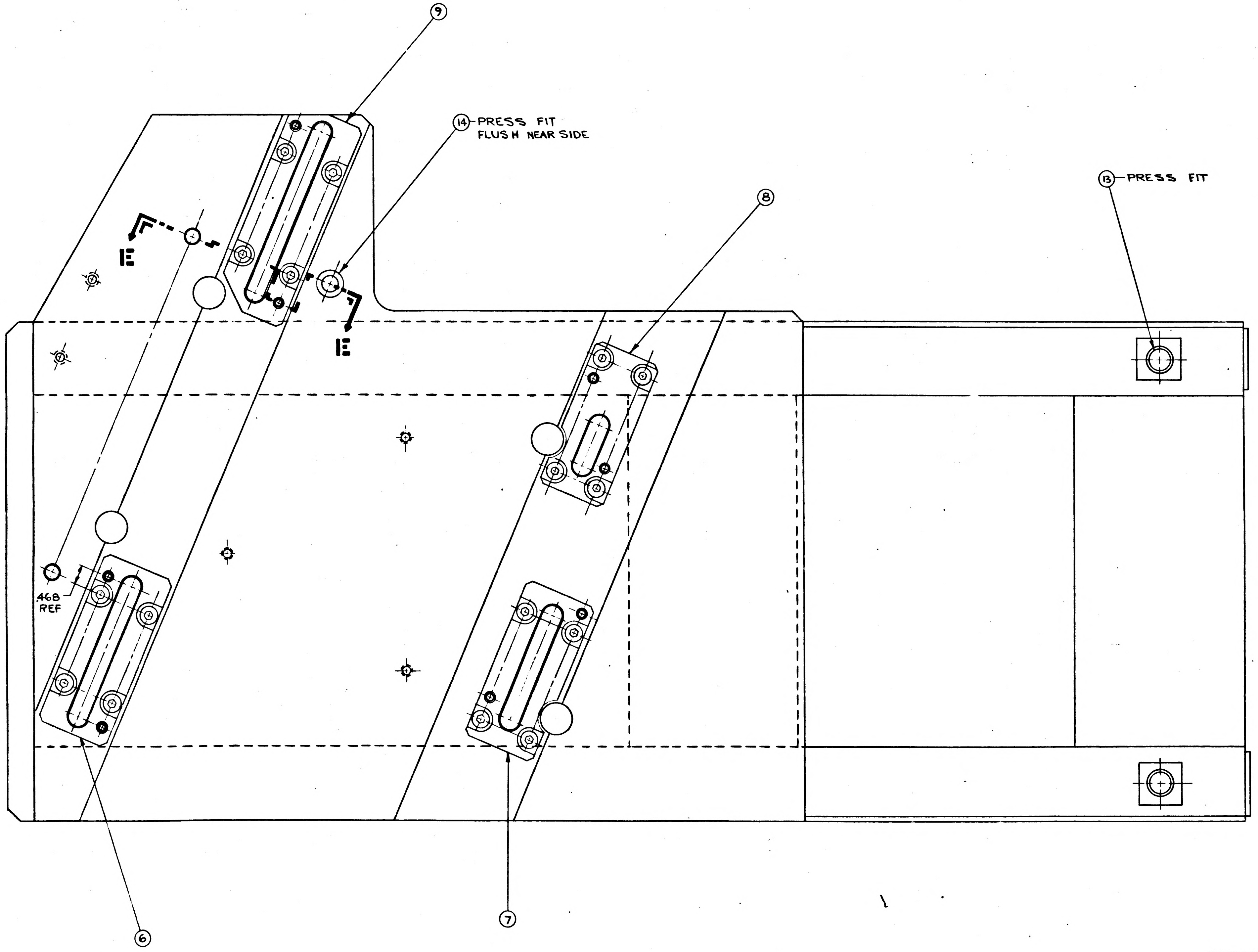
MASTER

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



⑫ PRESS FIT AS SHOWN
.250 2 PLACES
.1863 +.0005 -.0000 DIA THRU 8 HOLES
⑪ ⑩
.312±.031
⑤ PRESS FIT AS SHOWN

PARTIAL SECTION E-E



⑨
⑭ PRESS FIT FLUSH NEAR SIDE
E
E
⑧
⑬ PRESS FIT
.468 REF
⑥
⑦

VIEW B-B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019962	1019962
1019926	1019926

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±	—	±.005	±1°

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910244
DRAWN M.SCHORR DATE 3-25-65
CHECKED S. Sam 4-14-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATFORM, SLIDING,
ASSY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019919
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 3 OF 3

2A

APOLLO G&N Specification
PS 1019926 Rev. A
Original Issue Date: 5-11-65
Release Authority: TDRR 19004
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

G & N FIXTURE STAND

DRAWING NO. 1019926

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals MIT	Approvals NASA
6-12-65	A	20050	1, 2, 3, 4 & 5	W. M.	W. R.

This specification consists of page 1 to 6 inclusive.

APPROVALS	A. METZGER	G. McWEENEY 5-11-65	M.G. MURLEY 5-11-65		L. MARNOV 4-23-65	J. FABBRONI 4-23-65
	NASA/MSC	MIT/IL			KIC N. DUSHEY 4-23-65	

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the G & N Fixture Stand P/N 1019926.

2. APPLICABLE DOCUMENTS

2.1 Effective Issues. The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002023	Serialization, General Specification For
ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements For

DRAWINGS

APOLLO G&N

1019926	G & N Fixture Stand
1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1900014	G & N Fixture
1019769	Shaft Accuracy Tester

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 ALIGNMENT

With the G&N Fixture Stand mounted on either the G&N Fixture (1900014) or the Shaft Accuracy Tester (1019769), the G&N Fixture Stand shall be capable of aligning the Star-Horizon Simulator (1019977) optical axis to the optical axis of the Star-Horizon Simulator Certification Fixture (1019970) within ± 3.5 arc minutes. The G&N Fixture Stand shall also be capable of aligning the optical and translational axis of the Star-Horizon Simulator to the Optical Unit Assembly (2011000) as specified in Table 1 below.

Fixture Tilt Position	Simulator Star	Flooded OUA Photometer	Simulator Optical Axis To SXT LOS	Simulator Translation Axes To SXT Reticle Axes
0°	30 sec	Horizon	LLOS ± 2.5 min	± 10 min
15°	6 sec	Star Tracker	SLOS ± 2.5 min	± 10 min
0°	6 sec	Star Tracker	SLOS ± 2.5 min	± 10 min

Table I

3.1.2 STABILITY

The G&N Fixture Stand shall remain stable to the degree necessary to meet the optical and photometric accuracy requirements stated in para. 3.1.1 for a period of 4 hours when the ambient temperature is varied from 67°F to 77°F.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019926 and all drawings and engineering data referenced therein.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions.

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° ± 10°C

(b) Relative Humidity: 90% max.

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 SPECIAL TESTS

The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to selloff to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative, and shall be held in the vendor's plant or at any NASA designated Field Site as applicable.

4.2.1 The G&N Fixture Stand shall demonstrate its capability to align the Star-Horizon Simulator to the Star-Horizon Simulator Certification Fixture through the temp range specified in par. 3.1.2.

4.2.2 The G&N Fixture Stand shall demonstrate its capability to align the Star-Horizon Simulator to the OUA through the temp range specified in 3.1.2 and 3.1.1.

4.2.3 The G&N Fixture Stand shall demonstrate its capability to support certification of the Star-Horizon Simulator as specified in 3.1.1.

4.3 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Stand to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing 1019926, and shall include determination of at least the following.

Size, dimension, tolerance, appearance and markings.

Adequacy of materials, parts and subassemblies, compliance with specific ratings and conformance to applicable specifications.

Finish, coatings, construction, markings, and nameplates, as applicable.

Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.

Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

5.1 **Preservation and Packaging.** The Stand shall be preserved and packaged in accordance with ND 1002214.

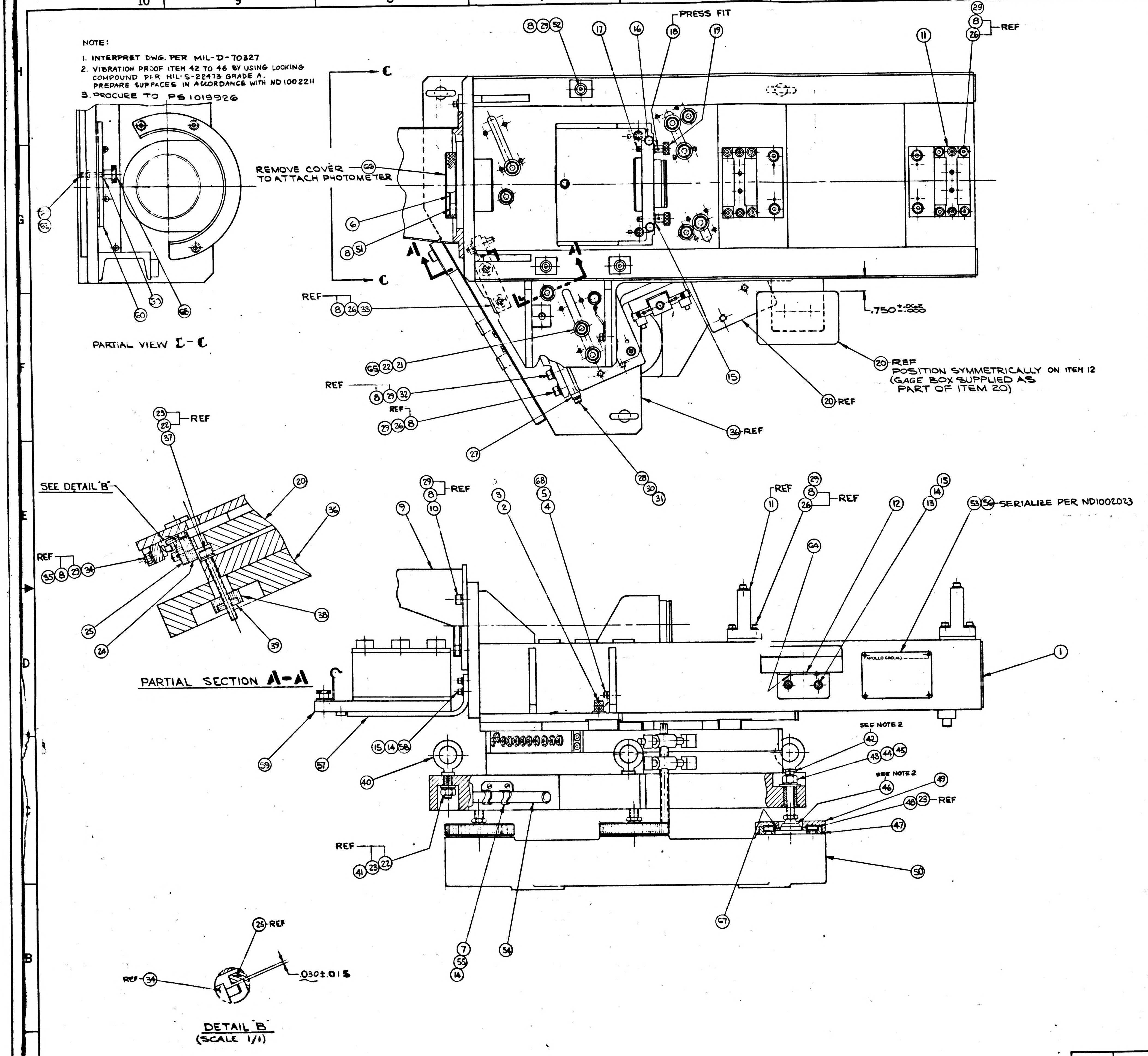
6. NOTES

6.1 The special tests designated in paragraph 4.4 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced therein.

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
-	-	CLASS A RELEASE PER TDRR 21714		

NOTE:

1. INTERPRET DWG. PER MIL-D-70327
2. VIBRATION PROOF ITEM 42 TO 46 BY USING LOCKING COMPOUND PER MIL-S-22473 GRADE A. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211
3. PROCURE TO PS 1019926


PRESS FIT
REF
REMOVE COVER TO ATTACH PHOTOMETER
C
A
PARTIAL VIEW C-C
.750 +.005 -.000
20-REF POSITION SYMMETRICALLY ON ITEM 12 (GAGE BOX SUPPLIED AS PART OF ITEM 20)
SEE DETAIL 'B'
PARTIAL SECTION A-A
53 54 SERIALIZE PER ND1002023
APOLLO GROUND
SEE NOTE 2
DETAIL 'B' (SCALE 1/1)
.030±.015

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
68	1		MS15795-303			WASHER, FLAT			
67	3		1022476	03386911508		PLATE, CLAMP			
66	1		1019546	03386911570		COVER, LIGHT			
65	6		MS15795-314			WASHER, FLAT			
64	2		MS35495-22			SCREW, WOOD			
63	1	*	1017423-4	7444304 3004		NUT, THUMB, KNURLED			
62	1		MS35691-410	74 44311 7001		NUT, PLAIN, HEX			
61	1		1022420	03386911280		STUD, THREADED			
60	1		1022307-011	02386910367		CLAMP ASSEMBLY			
59	1		1022873-011	02386910371		MIRROR MOUNT ASSY			
58	4		MS16995-39	7445505 8027		SCREW, CAP, SOCKET HD			
57	1		1022906-011	02386910368		BRACKET ASSEMBLY, MIRROR PLATFORM MTG			
56	4		MS21318-14	7445506 4008		SCREW, DRIVE, ROUND HEAD			
55	1		1022308	03386911222		CLIP, WRENCH			
54	1		1022939-011	02386910149		WRENCH, ADJUSTMENT			
53	1		1004260-306	03386911163		NAME PLATE			
52	3		MS16995-68	74455058048		SCREW, CAP, SOCKET HD			
51	4		MS16996-32	7445059024		SCREW, CAP, SOCKET HD			
50	1		1022206	03386910146		PLATE, ADAPTER			
49	3		1022197	03386911026		RETAINER			
48	12		MS16995-80	74455058056		SCREW, CAP, SOCKET HD			
47	3		1022154	03386911025		RING, POSITION			
46	3		1022475	03386911507		PAD, LEVELING			
45	3		1022202	03386910216		NUT, HEX PLAIN			
44	3		MS35337-86	74439050010		WASHER, LOCK, SPLIT			
43	3		AN960-C816	74468051010		WASHER, FLAT			
42	3		1022196	03386911024		STUD, THREADED			
41	3		MS35690-610	61501051060		NUT, HEX			
40	3	*	1001818-3	03386911443		BOLT-EYE			
39	4		1022207	03386911052		NUT, SQUARE			
38	4		1022208	03386911053		RETAINER, NUT			
37	4	*	1017418-88			SCREW CAP SOCKET HD			
36	1		1019917-011	02386910242		LEVELING PLATE ASSY			
35	1		MS35690-510	61501051050		NUT, HEX			
34	1		1022226	03386911072		PIN, ECCENTRIC			
33	1		1022225	03386911073		BLOCK, RETAINING			
32	5		MS16996-34	74455059026		SCREW, CAP, SOCKET HD			
31	4		MS35337-82	74439050006		WASHER, LOCK, SPLIT			
30	6		AN960-C416	74468051006		WASHER, FLAT			
29	26		AN960-C516	74468051007		WASHER, FLAT			
28	4		MS16996-23	74455059019		SCREW, CAP, SOCKET HD			
27	2		1019596	03386910847		STOP END			
26	16		MS16995-66	74455058046		SCREW, CAP, SOCKET HD			
25	1		1022204	03386911061		PLATE, TRACK GUIDE PIN			
24	1		1019582	03386910846		TRACK, GUIDE PIN			
23	19		AN960-C616	74468051008		WASHER, FLAT			
22	13		MS35337-84	74439050008		WASHER, LOCK, SPLIT			
21	6		MS16995-84	74455058060		SCREW CAP SOCKET HD			
20	1		1019916-021	02386910241		ADJUSTABLE ELEVATION PLATE ASSY			
19	3		1022247	03386911044		KNOB			
18	3		MS171434	74008008004		PIN, SPRING			
17	3		1022245	03386911045		SCREW			
16	2		1022246	03386911043		THUMB SCREW			
15	9		AN960-C10	74468051005		WASHER, FLAT			
14	8		MS35337-81	74439050005		WASHER, LOCK, SPLIT			
13	2		MS16996-10	74455059010		SCREW, CAP SOCKET HD			
12	1		1022307	03386910225		BRACKET			
11	2		1019955-011	02386910304		CLAMP ASSEMBLY			
10	3		MS16996-31	74455059023		SCREW, CAP, SOCKET HD			
9	1		1022199	03386910173		GUARD, PHOTOMETER			
8	32		MS35337-83	74439050007		WASHER, LOCK, SPLIT			
7	2		MS35233-62	74455054062		SCREW, PAN HD			
6	1		1019581	03386910845		ADAPTER, PHOTOMETER			
5	1		MS35337-78	74439050002		WASHER, LOCK, SPLIT			
4	1		MS16995-10	74455058010		SCREW, CAP SOCKET HD			
3	1		1019579	03386910843		PIN, STOP			
2	1	*	1001899-4	02386910246		CABLE ASSY			
1	1		1019919-011	02386910244		PLATFORM SLIDING, ASSY			
	-011								

LIST OF PARTS AND MATERIALS

*VENDOR ITEM - SEE SOURCE CONTROL DRAWING OR SPECIFICATION CONTROL DRAWING.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
NEXT ASSY | USED ON
APPLICATION
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910054
DRAWN M.S.CHORR DATE 4-20-65
CHECKED S. Sipos 5-3-65
APPROVAL W. 5-3-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GUIDANCE AND NAVIGATION
FIXTURE STAND

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019926
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

APOLLO G&N Specification
PS 1019926 Rev. —
Original Issue Date:
Release Authority: TDRR 19004
Class A Release

PROCUREMENT SPECIFICATION
PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS
STAR-HORIZON SIMULATOR MOUNTING FIXTURE
DRAWING NO. 1019926

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 6 inclusive.

6

APPROVALS		5/11/65	5-11-65	4-23-65	
	NASA/MSC	MIT/IL		KIC	4/23/65

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator Mounting Fixture PART No. 1019926.

1.2 Product Configuration Baseline Acceptances

1.2.1 The product configuration baseline shall be established by F. A. C. I. of the end item Serial No. . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No. unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS

2.1 Effective Issues. The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

Apollo G&N	
ND 1002023	Serialization, General Specification For
ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements For.

DRAWINGS

Apollo G&N	
1019926	Star-Horizon Simulator Mounting Fixture
1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1900014	G and N Fixture
1019769	Shaft Accuracy Tester

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 ALIGNMENT

With the Star-Horizon Simulator Mounting Fixture mounted on either the G&N Fixture (1900014) or the Shaft Accuracy Tester (1019769), the Star-Horizon Simulator Mounting Fixture shall be capable of aligning the Star-Horizon Simulator (1019977) optical axis to the optical axis of the Star-Horizon Simulator Certification Fixture (1019970) within ± 3.5 arc minutes. The Star-Horizon Simulator Mounting Fixture shall also be capable of aligning the optical and translational axis of the Star-Horizon Simulator to the Optical Unit Assembly (2011000) as specified in table 1. below.

Fixture Tilt Position	Simulator Star	Flooded OUA Photometer	Simulator Optical Axis To SXT LOS	Simulator Translation Axes To SXT Reticle Axes
0°	$30\ \widehat{\text{sec}}$	Horizon	LLOS $\pm 2.5\ \widehat{\text{min}}$	______
15°	$6\ \widehat{\text{sec}}$	Star Tracker	SLOS $\pm 2.5\ \widehat{\text{min}}$	$\pm 3\ \widehat{\text{sec}}$

Table 1.

3.1.2 STABILITY

The Star-Horizon Simulator Mounting Fixture shall remain stable to the degree necessary to meet the optical and photometric accuracy requirements stated in para 3.1.1 for a period of 4 hours when the ambient temperature is varied from 67°F to 77°F.

3.2.1 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019926 and all drawings and engineering data referenced therein.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon-formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions.

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: $25^\circ \pm 10^\circ$ C

(b) Relative Humidity: 90% max.

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 SPECIAL TESTS

The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to selloff to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative, and shall be held in the vendor's plant or at any NASA designated Field Site as applicable.

4.2.1 The Star-Horizon Simulator Mounting Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the Star-Horizon Simulator Certification Fixture through the temp range specified in par. 3.1.2.

4.2.2 The Star-Horizon Simulator Mounting Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the OUA through the temp range specified in 3.1.2.

4.2.3 The Star-Horizon Simulator Mounting Fixture shall demonstrate its capability to support certification of the Star-Horizon Simulator.

4.3 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Fixture to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing 1019926, and shall include determination of at least the following.

Size, dimension, tolerance, appearance and markings.

Adequacy of materials, parts and subassemblies; compliance with specific ratings and conformance to applicable specifications.

Finish, coatings, construction, markings, and nameplates, as applicable.

Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.

Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

5.1 Preservation and Packaging. The Fixture shall be preserved and packaged in accordance with ND 1002214.

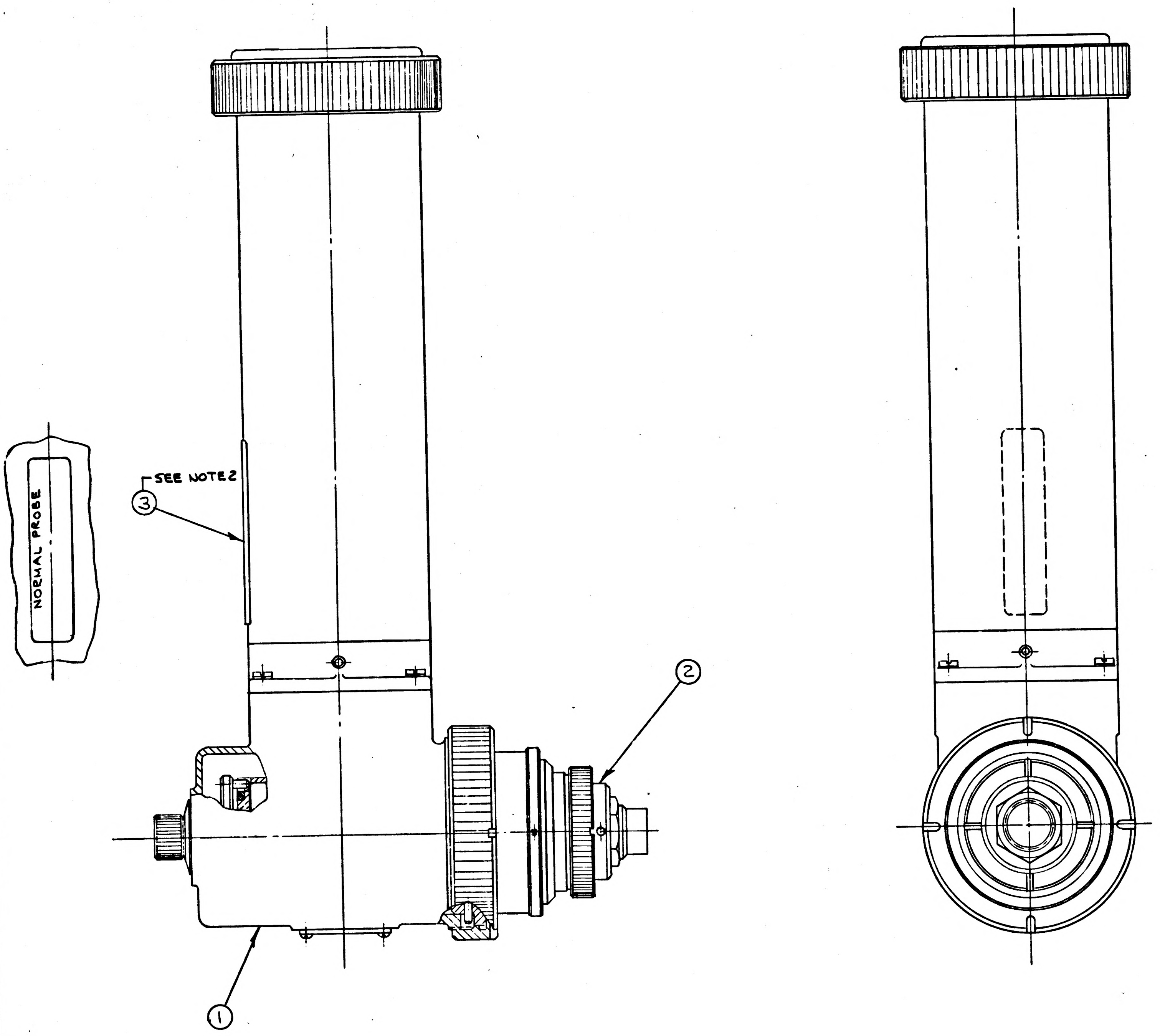
6. NOTES

6.1 The special tests designated in paragraph 4.4 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced therein.

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 19860

NOTE:
1- INTERPRET DWG. PER MIL-D-70327
2- CEMENT ITEM NO. 3 TO ITEM NO. 1 PER MIL-A-5092 TYPE 3



MASTER

ITEM NO.	QTY REQD -011	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION
3	1		1019456	03386911247		PLATE, IDENTIFICATION		
2	1		1019940-011	17700004262		PROBE, PHOTO CELL TESTER ADAPTER, ASSY		
1	1		1019908-011	17700004265		LENS HOUSING, PHOTO CELL ADAPTER ASSY		

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019896	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17700004270
DRAWN J. CARDILE DATE 11-17-64
CHECKED T. LOMNITZ 3-17-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

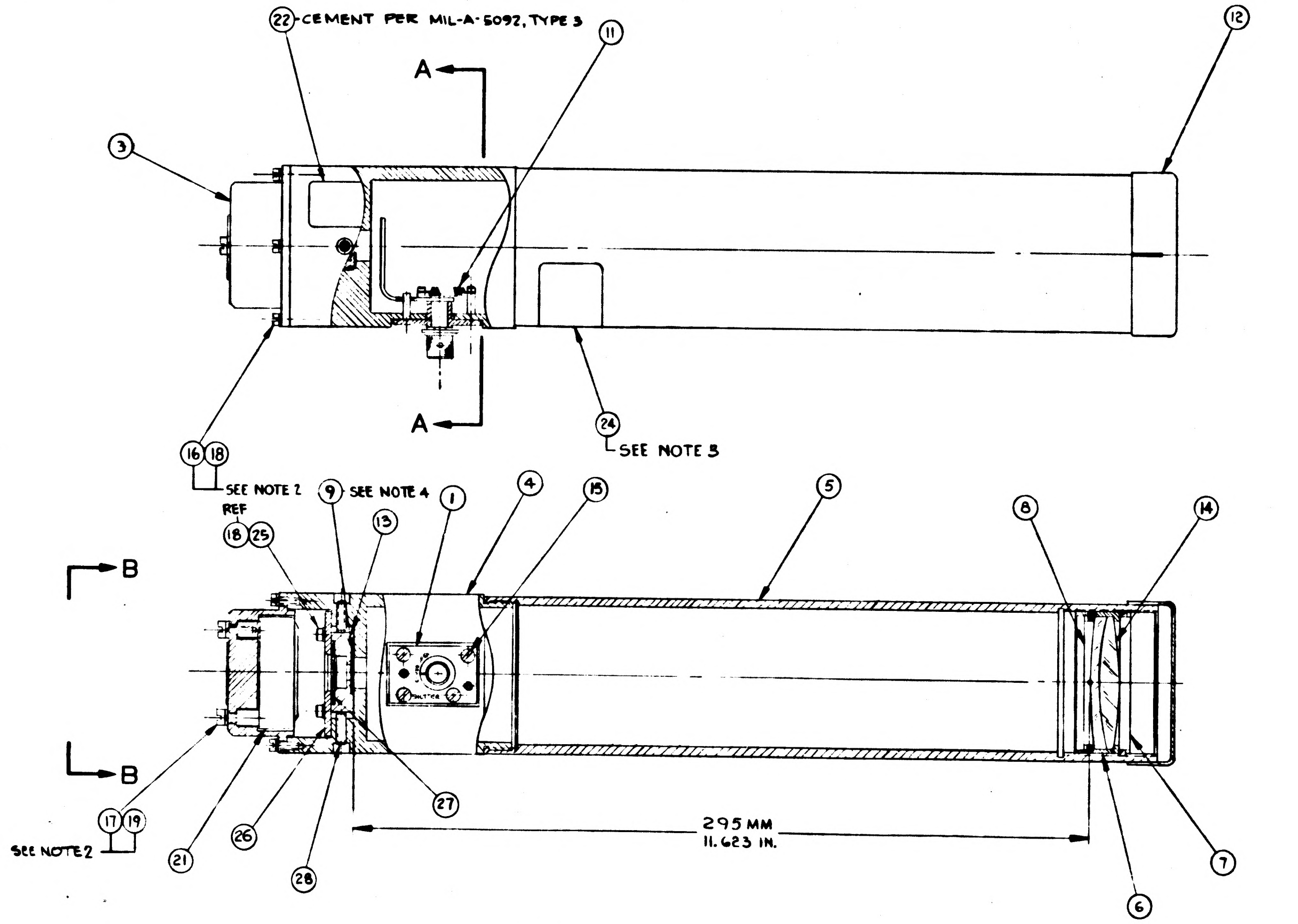
TITLE
NORMAL PROBE

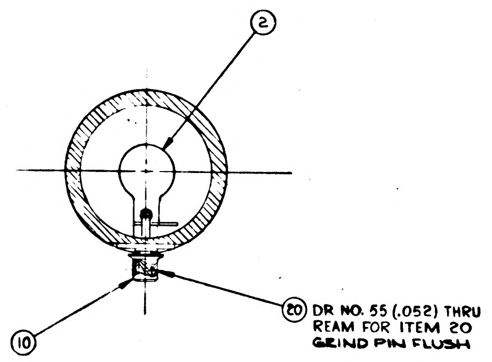
CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019944
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

02 38691 0015

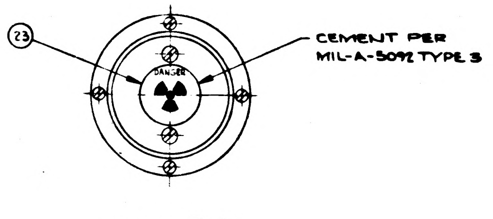
REVISIONS TDRR [illegible]				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER ECO 1907 TDRR NO. 20890 DATE 7-14-65	7-21-65 A.P	-23-65

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. ITEM NUMBERS 15 THRU 19 ARE TO BE BLACKENED PER MIL-C-13924 CLASS 3.
3. CEMENT ITEM 24 TO ITEM 5 PER MIL-A-5092 TYPE 3 AFTER UNIT HAS BEEN CALIBRATED AND INFORMATION ENGRAVED ON PLATE
4. (A3) CEMENT ITEM 9 TO ITEM 13 PER MIL-A-5092, TYPE 3.





SECTION A-A



VIEW B-B

ITEM NO.	QTY REQD -011	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
28	4		AN565AC8H8			SETSCREW, HEX HD, FLAT POINT			
27	1		1022518	03386911763		WASHER, WAVE			
26	1		1022517	03386911762		PLATE, RETAINER			
25	4		1017418-11	74455058011		SCREW, CAP, SOCKET HEAD			
24	1		1019532	17000011963		PLATE, IDENTIFICATION			
23	1		1019536	17000008988		PLATE, CAUTION			
22	1		1019533	03386911250		PLATE, IDENTIFICATION			
21	1		1001797	74471007001		TRITIUM LIGHT (ASSY)			
20	1		MS 24692-3	74444085001		PIN, TAPER			
19	2		MS35337-79	74439050003		WASHER, LOCK, SPLIT			
18	8		MS35337-78	74439050002		WASHER, LOCK, SPLIT			
17	2		MS35275-27	74455050027		SCREW, MACHINE DR FIL HD			
16	4		MS35275-14	74455050014		SCREW, MACHINE, DR FIL HD			
15	4		MS35249-20	74455052020		SCREW, MACHINE, FLAT CSK HD			
14	1		1019948	660-117		LENS, OPTICAL INSTRUMENT			
13	1		1022516	03386911761		APERTURE, MOUNT ADJUSTABLE			
12	1		1019514	17000010442		CAP, LENS			
11	1		1019517	17000010441		SPRING			
10	1		1019511	17000010440		KNOB, SHUTTER			
9	1		1019528	17000010439		APERTURE, TRITIUM			
8	1		1019516	17000010438		RING, LOCKING			
7	1		1019521	17000010437		RING, LOCKING			
6	1		1019518	17000010436		CELL, OBJECTIVE LENS			
5	1		1019522	17000010435		TUBE, EXTENSION LENS			
4	1		1019537	17000010434		HOUSING, SHUTTER AND TRITIUM			
3	1		1019520	17000010433		COVER, LIGHT			
2	1		1019946-011	17700004241		SHUTTER, PHOTOMETER ASSEMBLY			
1	1		1019947-011	17700004240		PLATE, SHUTTER, ASSEMBLY			

(A2) items 25–27; (A4) items 18–19; SEE NOTE NO.2 items 15–19; (A1) item 13

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019896	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17700004242

DRAWN K. GRUBLER DATE 12-10-64
CHECKED B. [illegible] 3-17-65
APPROVAL [illegible] 3-31-65
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR CALIBRATION
UNIT

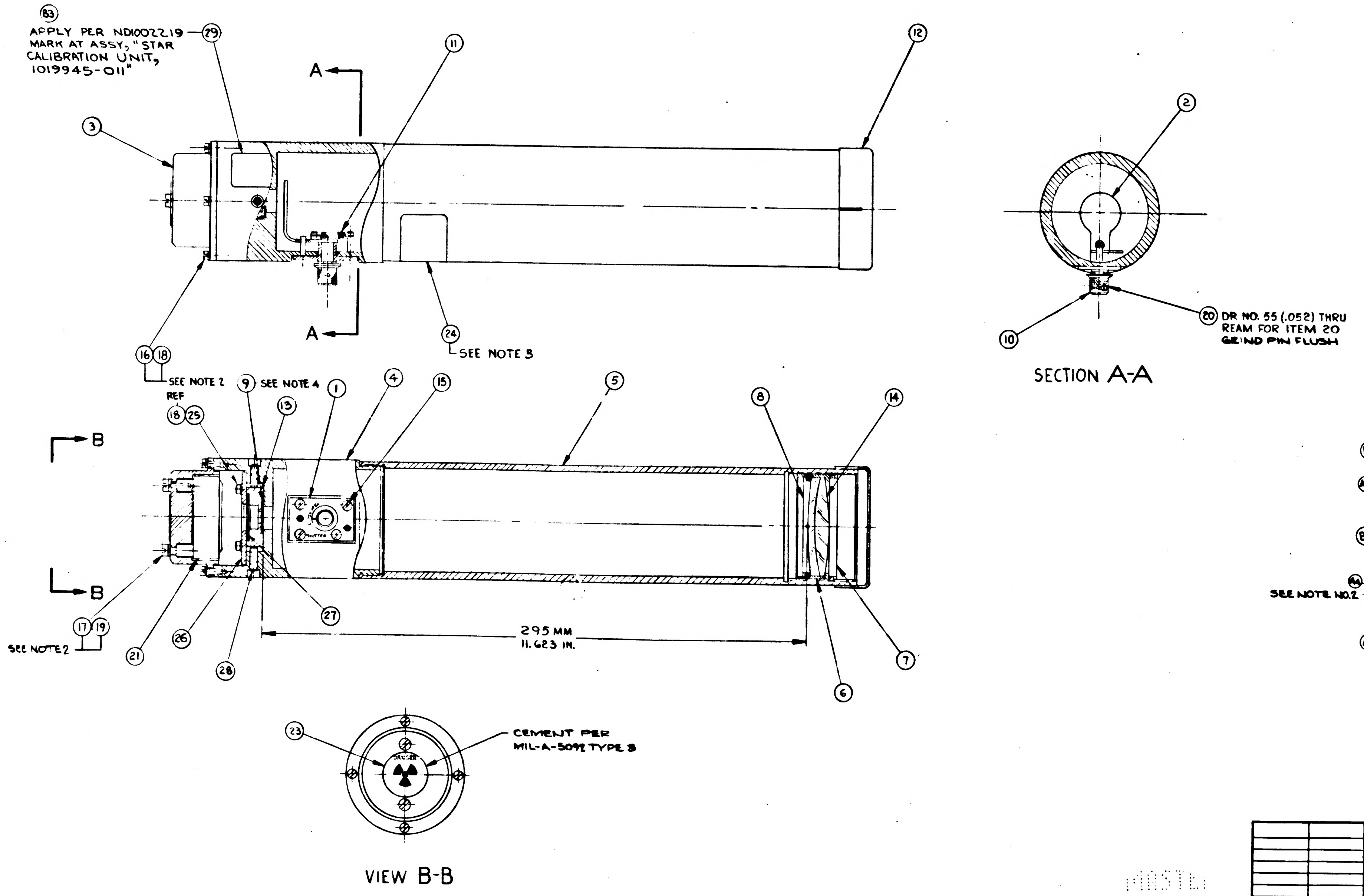
CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019945
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019945 A

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. ITEM NUMBERS 15 THRU 19 ARE TO BE BLACKENED PER MIL-C-13924 CLASS 3.
3. CEMENT ITEM 24 TO ITEM 5 PER MIL-A-5092 TYPE 3 AFTER UNIT HAS BEEN CALIBRATED AND INFORMATION ENGRAVED ON PLATE.
A3 4. CEMENT ITEM 9 TO ITEM 13 PER MIL-A-5092, TYPE 3.

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER ECO 1907 TDRR NO. 20890 DATE 7-14-65	7-21-65 A.F	7-22-65
B3		REVISED PER ECO 1.4353 TDRR NO. 22404 DATE 9-23-65	9-23-65	9-23



APPLY PER ND1002219 MARK AT ASSY, "STAR CALIBRATION UNIT, 1019945-011"
B3
29
11
12
3
A
A
24
SEE NOTE 3
16
18
SEE NOTE 2
2
20 DR NO. 55 (.052) THRU REAM FOR ITEM 20 GRIND PIN FLUSH
10
SECTION A-A
B
B
9
SEE NOTE 4
13
1
4
15
5
8
14
18
25
REF
27
295 MM
11.623 IN.
21
26
28
6
7
17
19
SEE NOTE 2
23
CEMENT PER MIL-A-5092 TYPE 3
VIEW B-B

SEE NOTE NO. 2

	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
B2	29	1		1004260-305	03386911791		PLATE, IDENTIFICATION			
	28	4		AN565AC8H8			SETSCREW, HEX HD, FLAT POINT			
A2	27	1		1022518	03386911763		WASHER, WAVE			
	26	1		1022517	03386911762		PLATE, RETAINER			
	25	4		1017418-11	74455058011		SCREW, CAP, SOCKET HEAD			
	24	1		1019532	17000011963		PLATE, IDENTIFICATION			
	23	1		1019586	17000008988		PLATE, CAUTION			
B1	22									
	21	1		1001797	74471007001		TRITIUM LIGHT (ASSY)			
	20	1		MS 24692-3	74444035001		PIN, TAPER			
A4	19	2		MS35337-79	74439050003		WASHER, LOCK, SPLIT			
	18	8		MS35337-78	74439050002		WASHER, LOCK, SPLIT			
	17	2		MS35275-27	74455050027		SCREW, MACHINE DR FIL HD			
	16	4		MS35275-14	74455050014		SCREW, MACHINE, DR FIL HD			
	15	4		MS35249-20	74455052020		SCREW, MACHINE, FLAT CSK HD			
	14	1		1019948	660-117		LENS, OPTICAL INSTRUMENT			
A1	13	1		1022516	03386911761		APERTURE, MOUNT ADJUSTABLE			
	12	1		1019514	17000010442		CAP, LENS			
	11	1		1019517	17000010441		SPRING			
	10	1		1019511	17000010440		KNOB, SHUTTER			
	9	1		1019528	17000010439		APERTURE, TRITIUM			
	8	1		1019516	17000010438		RING, LOCKING			
	7	1		1019521	17000010437		RING, LOCKING			
	6	1		1019518	17000010436		CELL, OBJECTIVE LENS			
	5	1		1019522	17000010435		TUBE, EXTENSION LENS			
	4	1		1019587	17000010434		HOUSING, SHUTTER AND TRITIUM			
	3	1		1019520	17000010433		COVER, LIGHT			
	2	1		1019946-011	17700004241		SHUTTER, PHOTOMETER ASSEMBLY			
	1	1		1019947-011	17700004240		PLATE, SHUTTER, ASSEMBLY			
		-011								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019896	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17700004242
DRAWN K. GRUBLER DATE 12-10-64
CHECKED B. [illegible] 3-17-65
APPROVAL [illegible] 3-31-65
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] 4 Jun 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR CALIBRATION UNIT

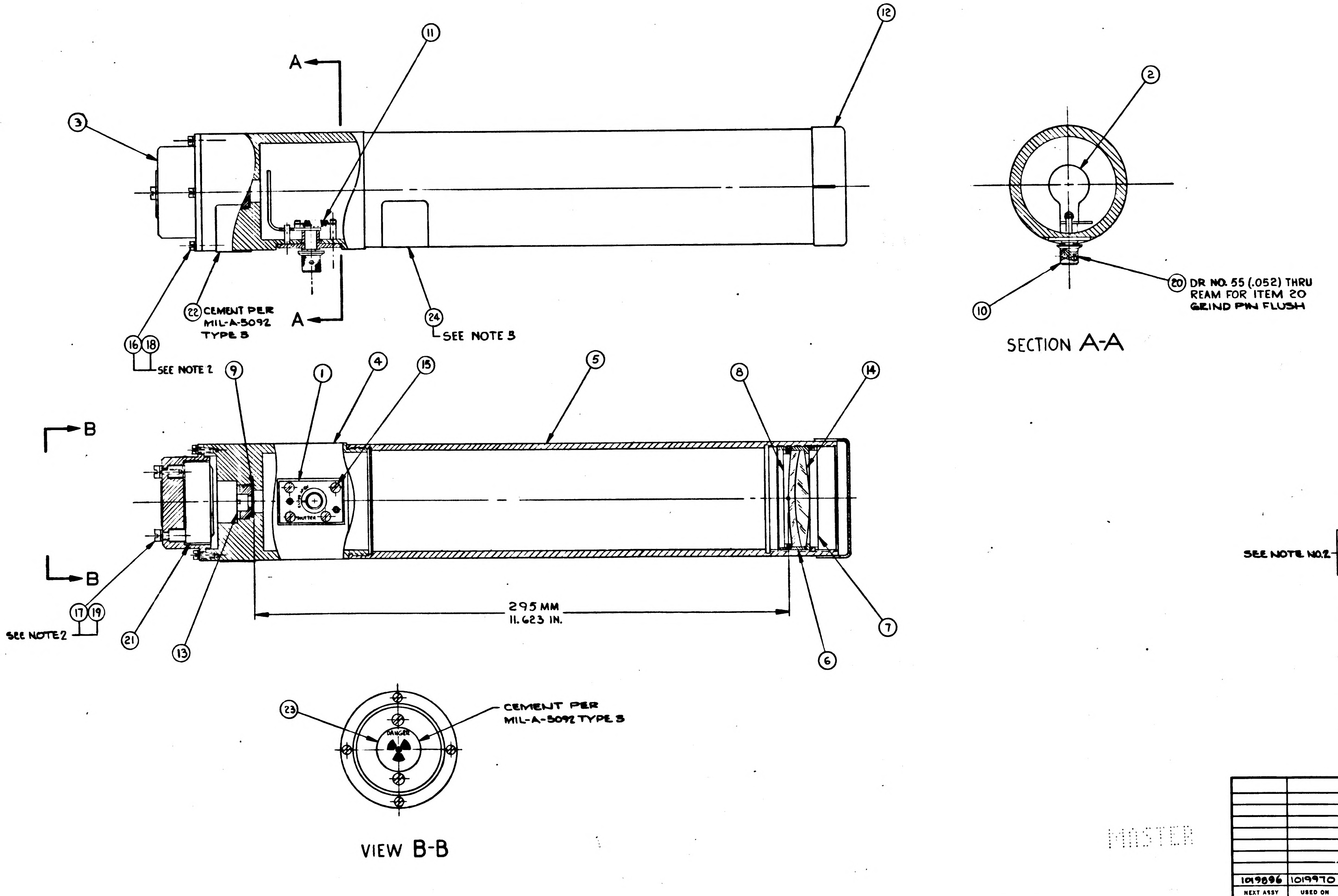
CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019945
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

1019945 B

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG PER MIL-D-70327
2. ITEM NUMBERS 15 THRU 19 ARE TO BE BLACKENED PER MIL-C-13924 CLASS 3.
3. CEMENT ITEM 24 TO ITEM 5 PER MIL-A-5092 TYPE 3 AFTER UNIT HAS BEEN CALBRATED AND INFORMATION ENGRAVED ON PLATE


A
A
③
⑪
⑫
㉒ CEMENT PER MIL-A-5092 TYPE 3
㉔ SEE NOTE 3
⑯ ⑱ SEE NOTE 2
SECTION A-A
②
⑩
⑳ DR NO. 55 (.052) THRU REAM FOR ITEM 20 GRIND PIN FLUSH
B
B
⑨
①
④
⑮
⑤
⑧
⑭
⑰ ⑲ SEE NOTE 2
㉑
⑬
⑥
⑦
295 MM
11.623 IN.
㉓
DANGER
CEMENT PER MIL-A-5092 TYPE 3
VIEW B-B

SEE NOTE NO.2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
24	1		1019532	17000011963		PLATE, IDENTIFICATION			
23	1		1019536	17000008988		PLATE, CAUTION			
22	1		1019533	03386911250		PLATE, IDENTIFICATION			
21	1		1001797	7447100700l		TRITIUM LIGHT (ASSY)			
20	1		MS 24692-3	74444035001		PIN, TAPER			
19	2		MS35337-79	74439050003		WASHER, LOCK, SPLIT			
18	4		MS35337-78	74439050002		WASHER, LOCK, SPLIT			
17	2		MS35275-27	74455050027		SCREW, MACHINE DR FIL HD			
16	4		MS35275-14	74455050014		SCREW, MACHINE, DR FIL HD			
15	4		MS35249-20	74455052020		SCREW, MACHINE, FLAT CSK HD			
14	1		1019948	660-117		LENS, OPTICAL INSTRUMENT			
13	1		1019455	17000009716		RETAINER, APERTURE			
12	1		1019514	17000010442		CAP, LENS			
11	1		1019517	17000010441		SPRING			
10	1		1019511	17000010440		KNOB, SHUTTER			
9	1		1019523	17000010439		APERTURE, TRITIUM			
8	1		1019516	17000010438		RING, LOCKING			
7	1		1019521	17000010437		RING, LOCKING			
6	1		1019518	17000010436		CELL, OBJECTIVE LENS			
5	1		1019522	17000010435		TUBE, EXTENSION LENS			
4	1		1019537	17000010434		HOUSING, SHUTTER AND TRITIUM			
3	1		1019520	17000010433		COVER, LIGHT			
2	1		1019946-011	17700004241		SHUTTER, PHOTOMETER ASSEMBLY			
1	1		1019947-011	17700004240		PLATE, SHUTTER, ASSEMBLY			
	-011								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019896	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17700004242

DRAWN K. GRUBLER DATE 12-10-64
CHECKED B. [illegible] 3-17-65
APPROVAL [illegible] 3-31-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
STAR CALIBRATION
UNIT

CODE IDENT NO. 89944 SIZE E NASA NUMBER 1019945

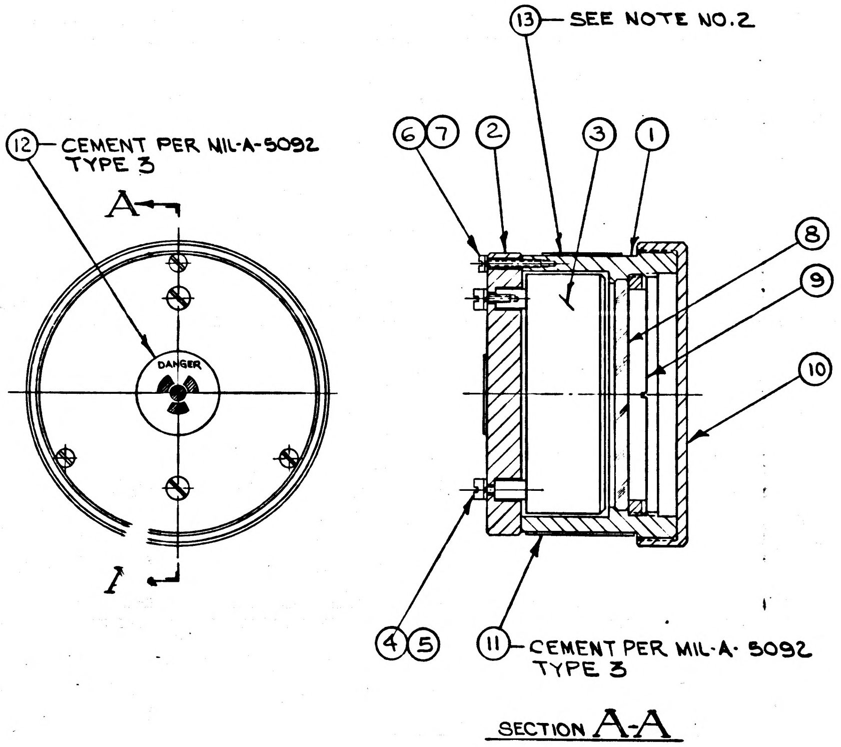
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

0638621 014-WB

SYM	ZONE	REVISIONS TDRR 19 DESCRIPTION	DATE	APPROVAL

NOTES:
1. -INTERPRET DWG PER MIL-D-70327
2. -CEMENT PER MIL-A-5092 TYPE 3 AFTER UNIT HAS BEEN CALIBRATED AND INFORMATION ENGRAVED ON PLATE.
3. BLACKEN ITEMS 4 THRU 7 PER MIL-C-13924 CLASS 3.
4. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (BAGGED).



⑫ CEMENT PER MIL-A-5092 TYPE 3
A
DANGER
A
⑬ SEE NOTE NO.2
⑥⑦
②
③
①
⑧
⑨
⑩
④⑤
⑪ CEMENT PER MIL-A-5092 TYPE 3

SECTION A-A

BLACKEN SEE NOTE 3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1	✓	1019550	17000011964		PLATE, IDENTIFICATION			
12	1		1019548	17000011004		PLATE, CAUTION			
11	1		1019549	03386911249		PLATE, IDENTIFICATION			
10	1	✓	1019546	17000011007		COVER, LIGHT HOUSING			
9	1	✓	1019547	17000010398		RING, EXT. THREADED			
8	1	✓	1019551	17000010397		WINDOW, OPTICAL INSTRUMENT			
7	3		MS35275-18	74455050018		SCREW, MACHINE, FIL. HD.			
6	3		MS35337-78	74439050002		WHSHER, LOCK, SPLIT, HELICAL			
5	2		MS35275-27	74455050027		SCREW, MACHINE, FIL HD			
4	2		MS35337-79	74439050003		WASHER, LOCK, SPLIT, HELICAL			
3	1		1001798	68201003801		TRITIUM LIGHT (ASSY)			
2	1	✓	1019552	17000011008		PLATE, MTG. TRITIUM LIGHT			
1	1	✓	1019553	17000010400		HOUSING, TRITIUM LIGHT			
	-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
1019896	1019970
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 17700004228
DRAWN J. CAROILE DATE 11/30/64
CHECKED B. WERTENTEL 3-15-65
APPROVAL [illegible] 3-19-65
APPROVAL
NASA APPROVAL A. C. [illegible] 6/4/65
[illegible] 6/3/65
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BACKGROUND
CALIBRATION UNIT

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019950
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

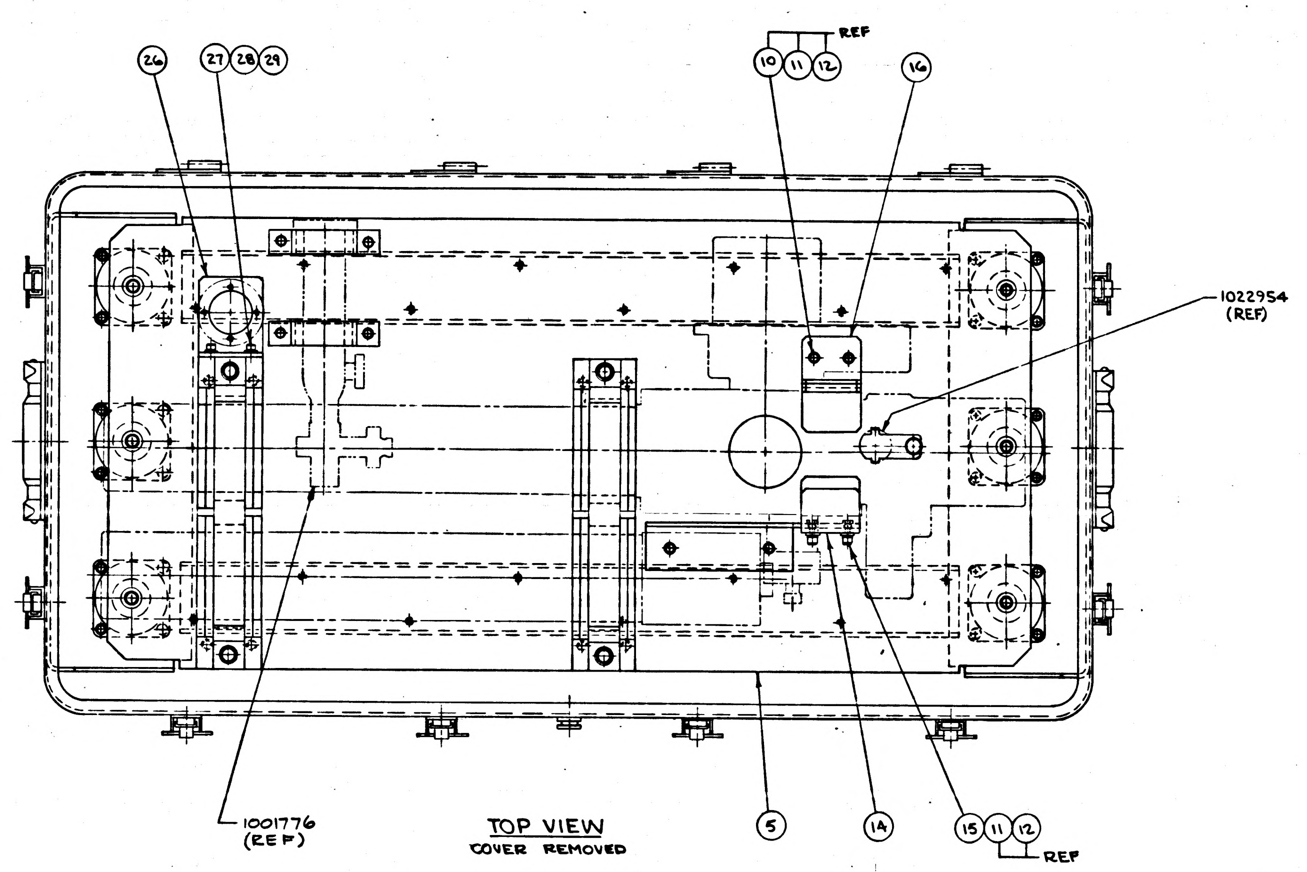
MASTER

NOTES:-

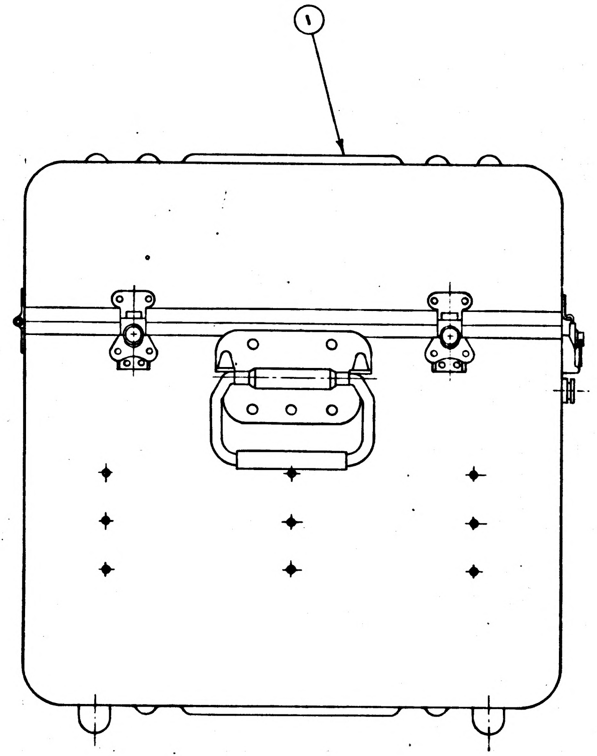
1-INTERPRET DWG PER MIL-D-70327
2-APPLY ITEM 31 PER ND1002219
3- SERIALIZE PER ND1002023.

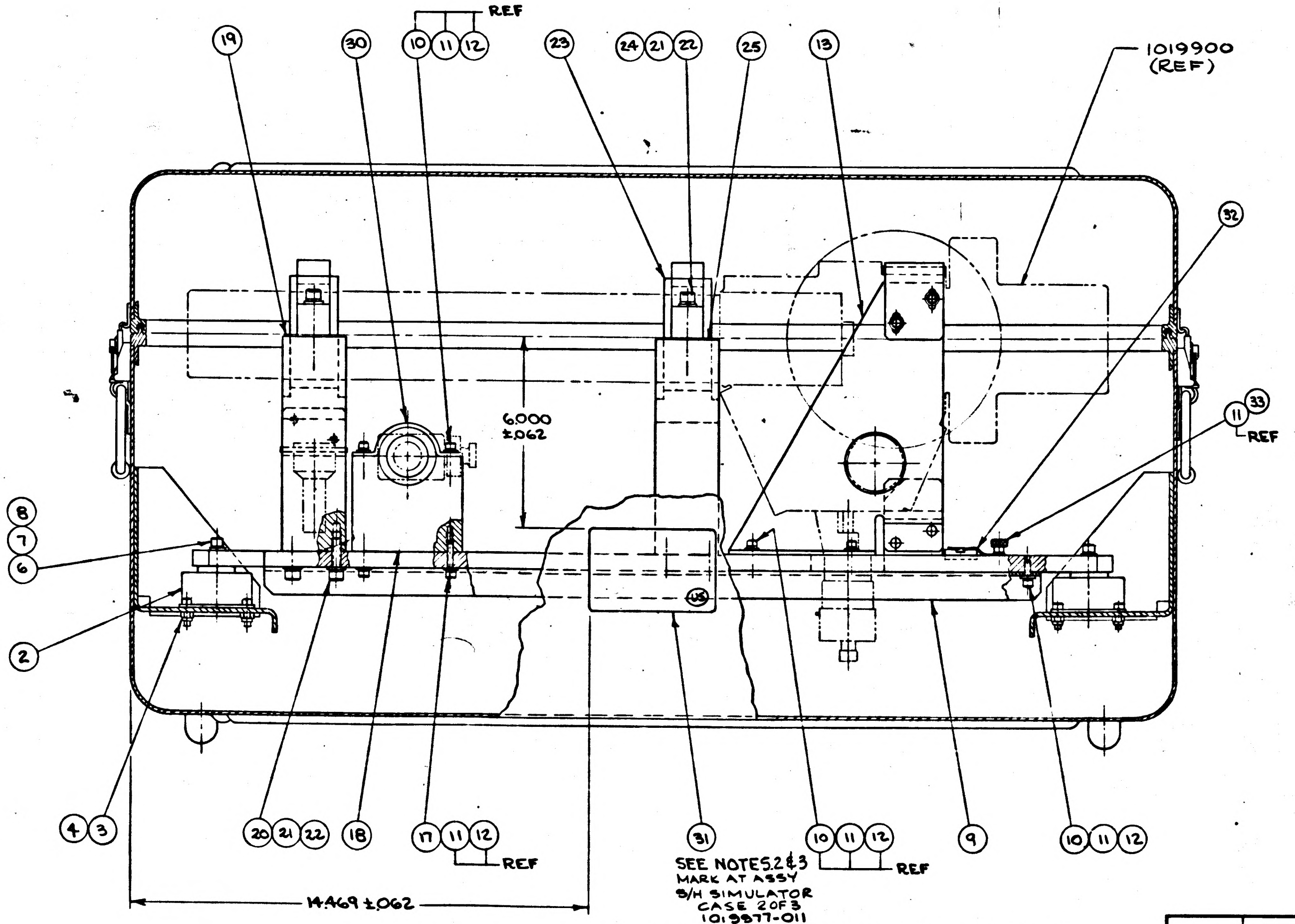
REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
	—	CLASS A RELEASE PER TDRR 21728		



TOP VIEW
COVER REMOVED





* VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING

MASTER

ITEM NO.	QTY REQD -011	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
33	1		1022527	03386911783		SCREW, THUMB			
32	1		1022528	03386911784		FILTER, SPRING			
31	1		1004260-307	03386911777		PLATE, IDENTIFICATION			
30	2		1022899-011	02386910396		CLAMP ASSY			
29	2		AN960-C8	74468051004		WASHER, FLAT			
28	2		MS35337-80	74439050004		WASHER, LOCK			
27	2		MS16995-26	74455058018		SCREW, CAP, SOCKET HD			
26	1		1022388	03386911362		BRACKET ANGLE			
25	1		1022912-021	02386910403		CRADLE ASSY			
24	4		MS16995-69	74455058049		SCREW, CAP, SOCKET HD			
23	2		1022911-011	02386910401		CLAMP AND LINER ASSY			
22	12		AN960-C516	74468051007		WASHER, FLAT			
21	12		MS35337-83	74439050007		WASHER, LOCK			
20	8		MS16995-67	74455058047		SCREW, CAP, SOCKET HD			
19	1		1022912-011	02386910402		CRADLE ASSY			
18	2		1022901-011	02386910398		CRADLE ASSY			
17	4		MS16995-39	74455058027		SCREW, CAP, SOCKET HD			
16	1		1022909-011	02386910399		SUPPORT ASSY			
15	2		MS16995-36	74455058024		SCREW, CAP, SOCKET HD			
14	1		1022900-011	02386910397		ANGLE CLAMP ASSY			
13	1		1022910-011	02386910400		SUPPORT BRACKET ASSY			
12	30		AN960-C10	74468051005		WASHER, FLAT			
11	31		MS35337-81	74439050005		WASHER, LOCK			
10	24		MS16995-37	74455058025		SCREW, CAP, SOCKET HD			
9	2		1022398	03386911375		CHANNEL			
8	6		AN960-C416	74468051006		WASHER, FLAT			
7	6		MS35337-82	74439050006		WASHER, LOCK			
6	6		MS16995-51	74455058035		SCREW, CAP, SOCKET HD			
5	1		1022394	03386911369		PLATE, SUPPORT			
4	24	*	1016151-011	74327008005		NUT, SELF LOCKING			
3	24		MS16995-38	74455058026		SCREW, CAP, SOCKET HD			
2	6	*	1001892	03386911386		ISOLATOR			
1	1	*	1001888	03386911371		CASE, STORAGE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1019977	1019977

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 02386910312
DRAWN H.E.BOLD DATE 3-24-65
CHECKED S. Sam 5-29-65
APPROVAL 6-6-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CARRYING CASE ASSY
(COLLIMATOR)

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019957
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

APOLLO G&N Specification
PS 1019962 Rev. A
Original Issue Date:
Release Authority: TDRR 18889.
Class A. Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS

AUXILIARY PRECISION TEST FIXTURE

DRAWING NO. 1019962

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
6-11-65	A	20049	1, 2, 3, 5	M. M.	W. R.

This specification consists of page 1 to 6 inclusive.

APPROVALS					
	NASA/MSC	5/11/65	5-11-65 MIT/IL	4-23-65	4/23/65 KIC 4/23/65

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Auxiliary Precision Test Fixture Stand Part No. 1019962.

1.2 Product Configuration Baseline Acceptances.

1.2.1 The product configuration baseline shall be established by F. A. C. I. of the end item Serial No. . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No. unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS

2.1 Effective Issues. The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

Apollo G&N

ND 1002023	Serialization, General Specification For
ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements For

DRAWINGS

Apollo G&N

1019962	Auxiliary Precision Test Fixture Stand
1019977	Star-Horizon Simulator

2011000	Optical Unit Assembly
1017410	5" Autocollimator
1019970	Star-Horizon Simulator Certification Fixture

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3. PERFORMANCE

3.1.1 ALIGNMENT

The Auxiliary Precision Test Fixture shall be capable of aligning the Star-Horizon Simulator (1019977) optical axis to the optical axis of the Star-Horizon Simulator Certification Fixture (1019970) within ± 3.5 arc minutes. The Auxiliary Precision Test Fixture shall also be capable of aligning the optical and translational axis of the Star-Horizon Simulator to the Optical Unit Assembly (2011000) as specified in table 1. below.

Table 1.

Fixture Tilt Position	Simulator Star	Flooded OUA Photometer	Simulator Optical Axis To SXT LOS	Simulator Translation Axes To SXT Reticle Axes
0°	30 sec	Horizon	LLOS ± 2.5 min.	± 10 min.
15°	6 sec	Star Tracker	SLOS ± 2.5 min.	± 10 min.
0°	6 sec	Star Tracker	SLOS ± 2.5 min.	± 10 min.

3.1.2 STABILITY

The Auxiliary Precision Test Fixture shall remain stable to the degree necessary to meet the optical and photometric accuracy requirements stated in para. 3,1.1 for a period of 4 hours when the ambient temperature is varied from 67° to 77°F.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019962 and all drawings and engineering data referenced therein.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The Contractor responsible for the manufacture of the Stand shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions.

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature:	25° C ± 10°C
(b) Relative Humidity:	90% max.
(c) Barometric Pressure:	23 to 32 inches of Hg

4.2 SPECIAL TESTS

The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to selloff to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative, and shall be held in the vendor's plant or at any NASA designated Field Site as applicable.

4.2.1 The Auxiliary Precision Test Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the Star-Horizon Simulator Certification Fixture through the temperature range specified in par. 3.1.2 and para. 3.1.1.

4.2.2 The Auxiliary Precision Test Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the OUA through the temperature range specified in par. 3.1.2 and par. 3.1.1.

4.2.3 The Auxiliary Precision Test Fixture shall demonstrate its capability to support certification of the Star-Horizon Simulator as specified in par. 2.1.1.

4.2.4 The Auxiliary Precision Test Fixture shall demonstrate the capability of mounting the 5 inch autocollimator (1017410) to view the OUA, and measure parallelism of SLOS and LLOS.

4.3 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Stand to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing specified in section 2, and shall include determination of at least the following:

1. Size, dimension, tolerance, appearance and markings.
2. Adequacy of materials, parts, and subassemblies; compliance with specific ratings and conformance to applicable specifications.
3. Finish coatings, construction, markings, and nameplates, as applicable.
4. Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.
5. Workmanship and cleanup.

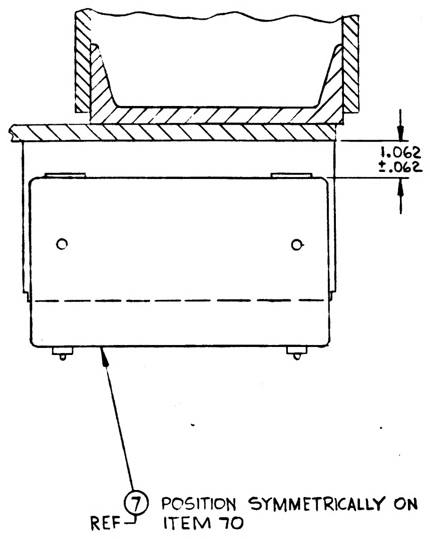
5. PREPARATION FOR DELIVERY

5.1 PRESERVATION AND PACKAGING. The Stand shall be preserved and packaged in accordance with ND 1002214.

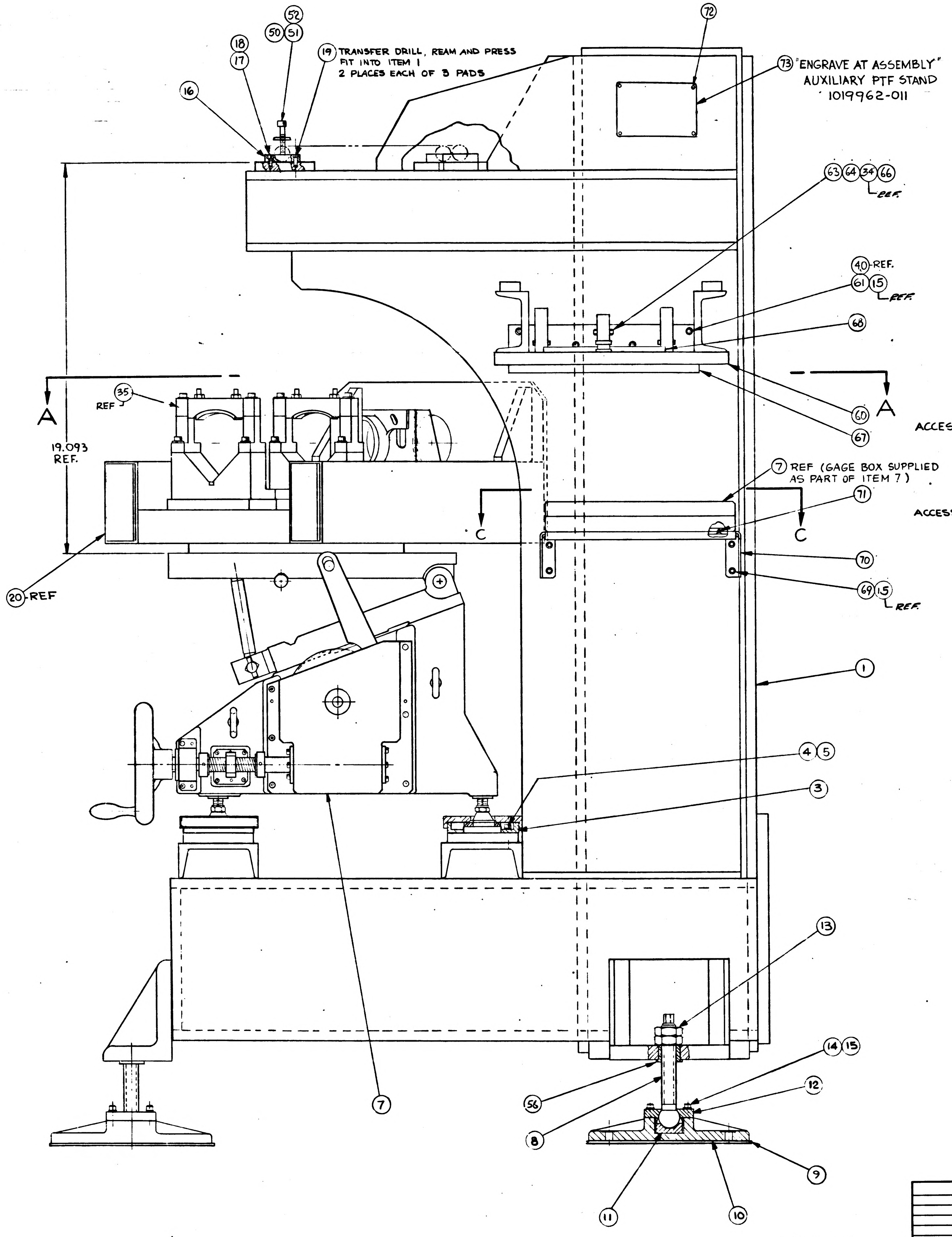
6. NOTES.

6.1 The special tests designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced therein.

NOTES:
1. INTERPRET DWG PER MIL-D-70327.



PARTIAL SECTION C-C



ACCESSORIES

ACCESSORIES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
73	1		1004260-306	03386911163		PLATE, IDENTIFICATION			
72	4		MS21318-14	74455064008		SCREW, DRIVE, ROUND HEAD			
71	2		MS16198-1			SCREW, WOOD, SLOTTED ROUND HD.			
70	1		1022425	03386911251		BRACKET, GAGE BOX MOUNTING			
69	4		MS16996-9			SCREW, CAP, SOCKET HEAD			
68	1		1022907-011	02386910367		CLAMP ASSEMBLY			
67	1		1022906-011	02386910368		BRACKET ASSY MIRROR PLATFORM MTG.			
66	1		MS35691-410	74443117001		NUT, PLAIN, HEX JAM			
65									
64	1		1022420	03386911280		STUD, THREADED			
63	1		1017423-4	74443043004		NUT, THUMB, KNURLED			
62									
61	4		MS16996-11			SCREW, CAP, SOCKET HEAD			
60	1		1022873-011	02386910371		MOUNT, MIRROR ASSEMBLY			
59	8		MS35650-104			NUT, PLAIN HEX			
58	1		1022832-011	02386910308		ADAPTER AND GASKET ASSY			
57	3		1017418-48	74455058048		SCREW, SOCKET HD, CAP			
56	3		1019178	03386900713		BUSHING, LEVELING			
55	4		1017479-46	74455059024		SCREW, CAP SOC HEAD			
54	1		1019581	03386910845		ADAPTER, PHOTOMETER			
53	1		1019954-011	02386910089		SUPPORT ASSY, AUTOCOLLIMATOR			
52	3		AN960-C416	74468051006		WASHER, PLAIN FLAT			
51	3		MS16995-56	74455058040		SCREW, CAP, SOC. HEAD			
50	3		1019156	03386910671		BALL, MOUNTING			
49	1		MS35337-78	74439050002		WASHER, SPLIT LOCK			
48	1		1017418-10	74455058010		SCREW, CAP, SOC. HEAD			
47	3		MS171434	74008008004		PIN, SPRING			
46	3		1022248	03386911045		SCREW			
45	3		1022247	03386911044		KNOB			
44	2		1022246	03386911043		THUMB SCREW			
43									
42	1		MS15795-303			WASHER, FLAT			
41	1		1019546	03386911570		COVER, LIGHT, HOUSING			
40	3		AN960-C10	74468051005		WASHER, FLAT			
39	1		1019579	03386910843		PIN, STOP			
38	1		1022226	03386911072		PIN, ECCENTRIC			
37	1		MS35690-510	61501051050		NUT, PLAIN HEX			
36	1		1022225	03386911073		BLOCK, RETAINER			
35	2		1019955-011	02386910304		CLAMP ASSEMBLY			
34	5		AN960-C416	74468051006		WASHER, FLAT			
33	4		MS35337-82	74439050006		WASHER, SPLIT LOCK			
32	4		1017479-34	74455059019		SCREW, CAP, SOC. HEAD			
31	5		1017479-48	74455059026		SCREW, CAP, SOC. HEAD			
30	26		AN960-C516	74468051007		WASHER, FLAT			
29	26		MS35337-83	74439050007		WASHER, SPLIT LOCK			
28	16		1017418-46	74455058046		SCREW, CAP, SOC. HEAD			
27	2		1019596	03386910847		STOP, END			
26	1		1019582	03386910846		TRACK, GUIDE PIN			
25	1		1022204	03386911061		PLATE, TRACK GUIDE PIN			
24	1		1001899-1	02386910246		CABLE ASSY			
23	6		MS35337-84	74439050008		WASHER, SPLIT LOCK			
22	6		MS15795-314			WASHER, FLAT			
21	6		1017418-60	74455058060		SCREW, CAP, SOC. HEAD			
20	1		1019919-011	02386910244		PLATFORM, SLIDING ASSY			
19	6		1019128-60	0338690067260		PIN, DOWEL			
18	9		MS35338-78	74439050002		WASHER, SPLIT LOCK			
17	9		1017418-11	74455058011		SCREW, CAP, SOC HEAD			
16	3		1022198	03386910215		INSERT, BALL			
15	20		MS35337-81	74439050005		WASHER, SPLIT LOCK			
14	12		1017418-28	74455058028		SCREW, CAP, SOC. HEAD			
13	6		1019276	03386900881		NUT, PLAIN HEX			
12	3		1019302	03386900880		RETAINER, LEVELING SCREW			
11	3		1019301	03386900879		BLOCK, LEVELING SCREW			
10	3		1019297	03386900878		FOOT, ALIGNMENT TEST FIXTURE (MACH)			
9	3		1019295	03386900876		PAD			
8	3		1022077	03386910907		SCREW, LEVELING			
7	1		1022824-011	02386910098		ELEVATION PLATE AND SUPPORT ASSY.			
6									
5	16		MS15795-310			WASHER, FLAT			
4	12		MS16995-49	74455058033		SCREW, CAP, SOC HEAD			
3	3		1022154	03386911025		RING, POSITION			
2									
1	1		1022075	02386910905		BASE, AUX. PTF (WELDMENT)			
	-011								

LIST OF PARTS AND MATERIALS

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
~
CONTRACT

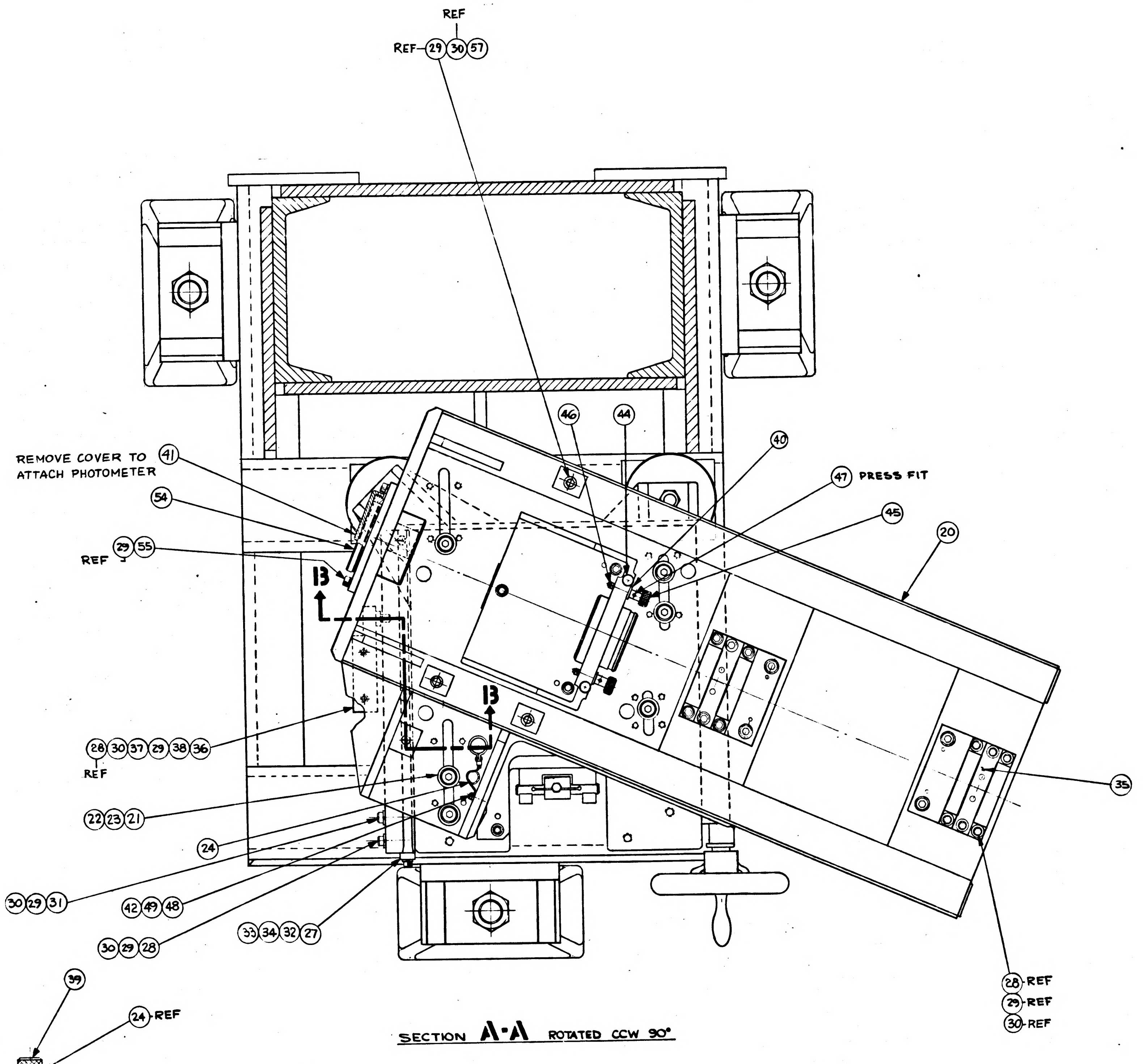
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910043
DRAWN J. P. Downs DATE 4-21-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AUXILIARY PTF STAND
ASSEMBLY

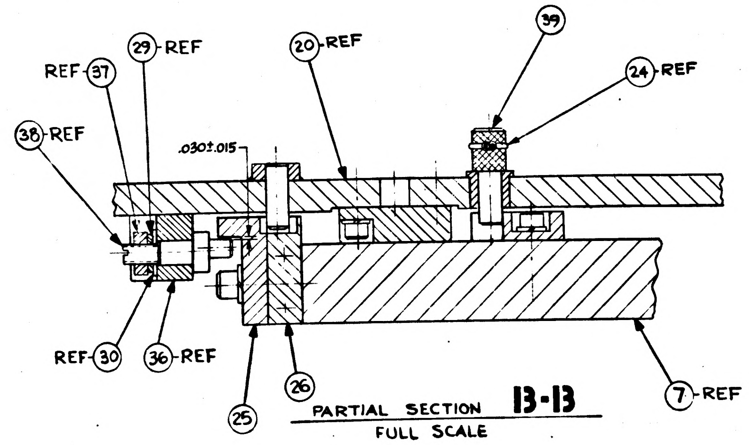
CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019962
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



REF
REF-29 30 57
REMOVE COVER TO ATTACH PHOTOMETER 41
54
REF 29 55
B
B
46
44
40
47 PRESS FIT
45
20
28 30 37 29 38 36 REF
22 23 21
24
30 29 31
42 49 48
30 29 28
33 34 32 27
35
28-REF
29-REF
30-REF

SECTION A-A ROTATED CCW 90°



REF-37
29-REF
20-REF
39
24-REF
38-REF
.030±.015
REF-30
36-REF
25
26
7-REF

PARTIAL SECTION B-B
FULL SCALE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910043
DRAWN I.P. Dennis DATE 4-2065
CHECKED [illegible] 5-4-65
APPROVAL [illegible] 5-4-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

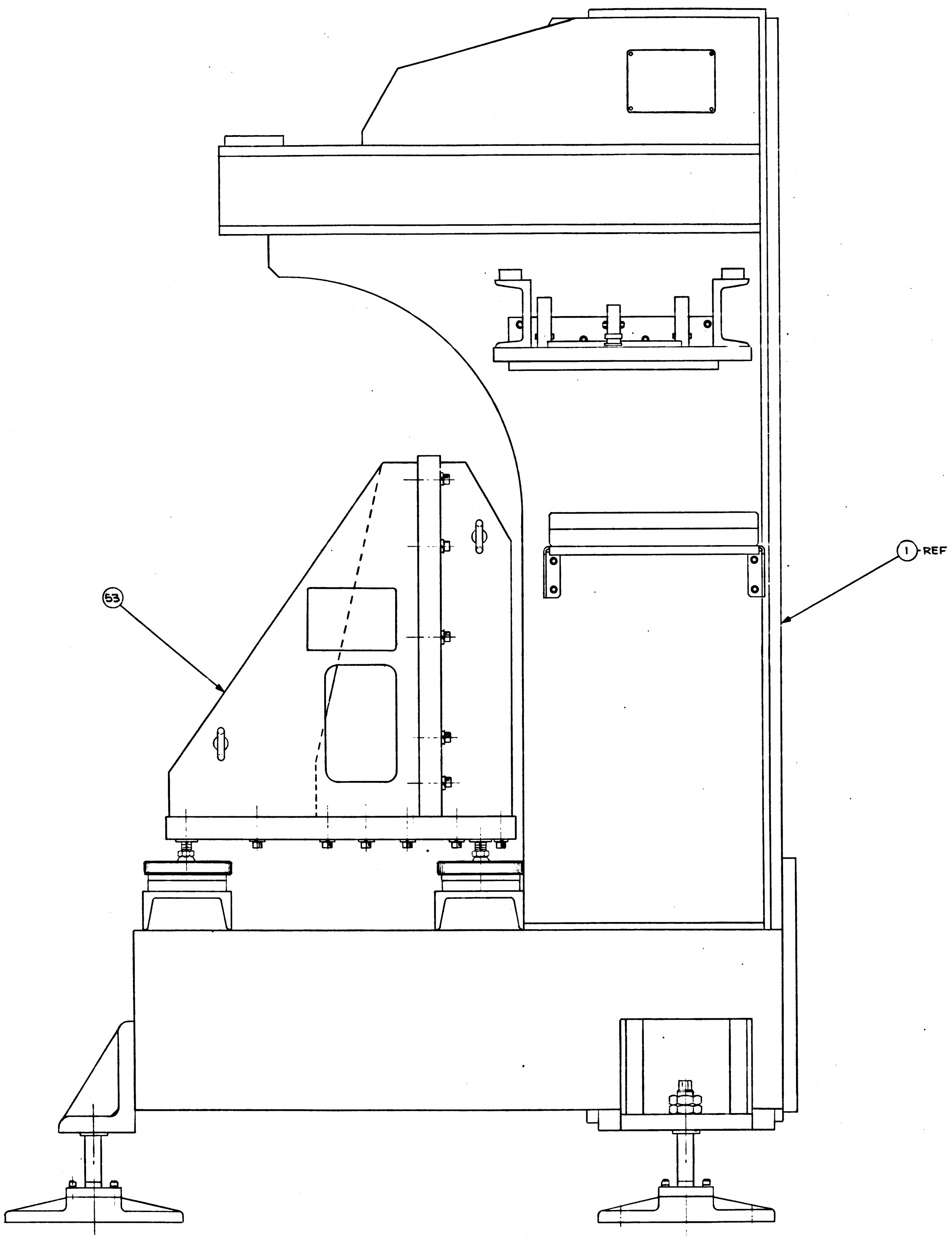
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AUXILIARY PTF STAND
ASSEMBLY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019962
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 2 OF 3

1019962

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



ACCESSORY ONLY
VIEW SHOWN WITH ITEM 53 MOUNTED

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910043
DRAWN J.P. Demas DATE 9-21-65
CHECKED B. Kulunski 5-6-65
APPROVAL 5-6-
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
AUXILIARY PTF STAND
ASSEMBLY

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019962
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 3

APOLLO G&N Specification
PS 1019962 Rev.______
Original Issue Date:
Release Authority: TDRR 18889.
Class A **Release**

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS

AUXILIARY PRECISION TEST FIXTURE

DRAWING NO. 1019962

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 6 inclusive.
6

APPROVALS	NASA/MSC	G. McLeaney 5/11/65	5-11-65 MIT/IL		4-23-65 KIC	4/23/65 4/23/65

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Auxiliary Precision Test Fixture Stand Part No. 1019962.

1.2 Product Configuration Baseline Acceptances.

1.2.1 The product configuration baseline shall be established by F. A. C. I. of the end item Serial No.   . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No.   unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS

2.1 Effective Issues. The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

Apollo G&N

ND 1002023	Serialization, General Specification For
ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements For

DRAWINGS

Apollo G&N

1019962	Auxiliary Precision Test Fixture Stand
1019977	Star-Horizon Simulator
1900014	G & N Fixture
1019769	Shaft Accuracy Tester
2011000	Optical Unit Assembly
1017410	5" Autocollimator

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement.functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 ALIGNMENT

The Auxiliary Precision Test Fixture shall be capable of aligning the Star-Horizon Simulator (1019977) optical axis to the optical axis of the Star-Horizon Simulator Certification Fixture (1019970) within ± 3.5 arc minutes. The Auxiliary Precision Test Fixture shall also be capable of aligning the optical and translational axis of the Star-Horizon Simulator to the Optical Unit Assembly (2011000) as specified in table 1. below.

Fixture Tilt Position	Simulator Star	Flooded OUA Photometer	Simulator Optical Axis To SXT LOS	Simulator Translation Axes To SXT Reticle Axes
0°	30 $\widehat{\text{sec}}$	Horizon	LLOS ±2.5 $\widehat{\text{min}}$	______
15°	6 $\widehat{\text{sec}}$	Star Tracker	SLOS ±2.5 $\widehat{\text{min}}$	± 3 sec

Table 1.

3.1.2 STABILITY

The Auxiliary Precision Test Fixture shall remain stable to the degree necessary to meet the optical and photometric accuracy requirements stated in para 3.1.1 for a period of 4 hours when the ambient temperature is varied from 67°F to 77°F.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019962 and all drawings and engineering data referenced therein.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The Contractor responsible for the manufacture of the Stand shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon-formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Condtions.

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° C ± 10° C

(b) Relative Humidity: 90% max.

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 SPECIAL TESTS

The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to selloff to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative, and shall be held in the vendor's plant or at any NASA designated Field Site as applicable.

4.2.1 The Auxiliary Precision Test Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the Star-Horizon Simulator Certification Fixture through the temp range specified in par 3.1.2.

4.2.2 The Auxiliary Precision Test Fixture shall demonstrate its capability to align the Star-Horizon Simulator to the OUA through the temp range specified in par 3.1.2.

4.2.3 The Auxiliary Precision Test Fixture shall demonstrate its capability to support certification of the Star-Horizon Simulator.

4.3 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Stand to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing specified in section 2, and shall include determination of at least the following:

1. Size, dimension, tolerance, appearance and markings.
2. Adequacy of materials, parts, and subassemblies; compliance with specific ratings and conformance to applicable specifications.
3. Finish coatings, construction, markings, and nameplates, as applicable.
4. Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.
5. Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

5.1 PRESERVATION AND PACKAGING. The Stand shall be preserved and packaged in accordance with ND 1002214.

6. NOTES.

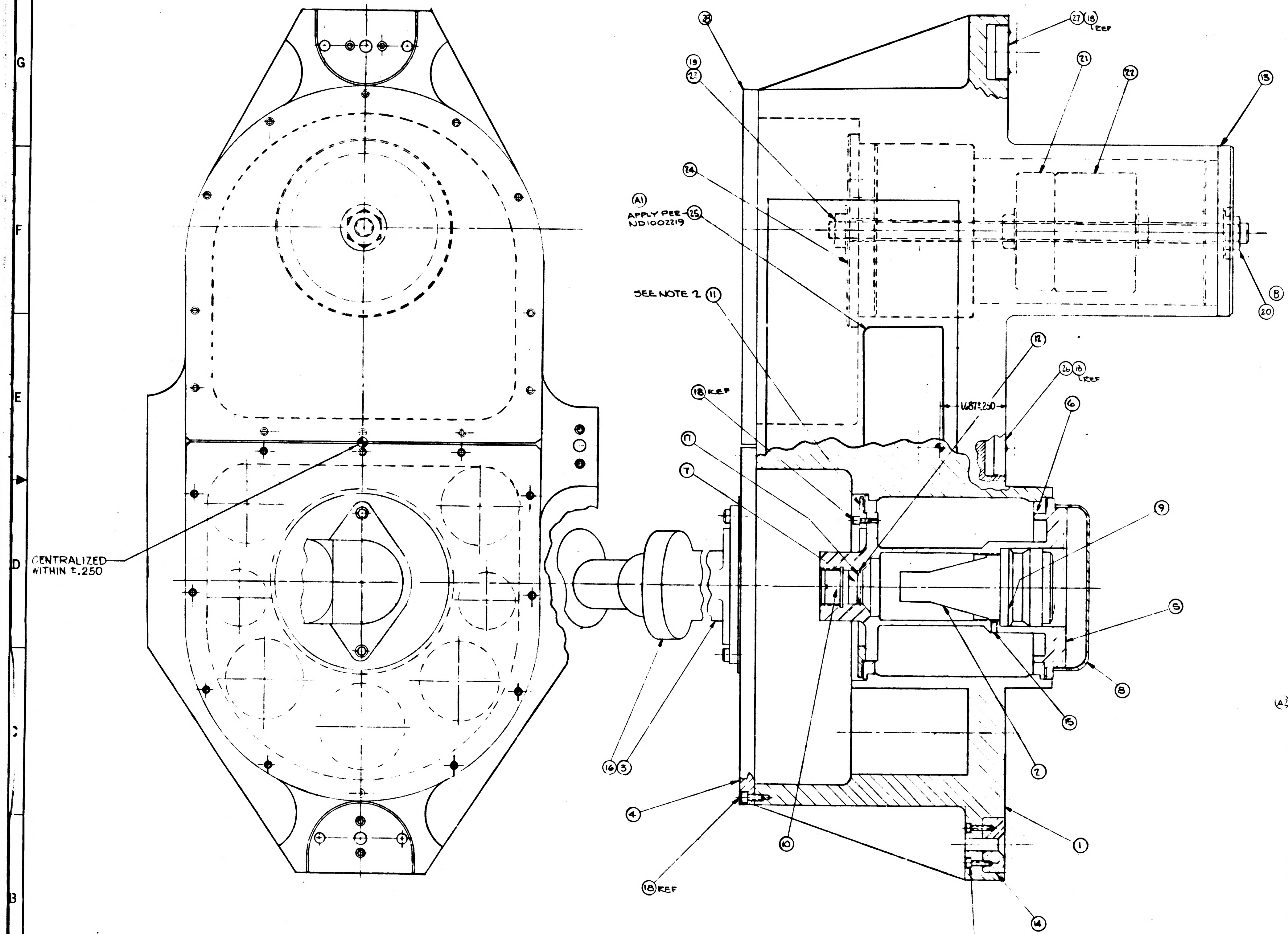
6.1 The special tests designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced therein.

NOTES:

1. INTERPRET DWG PER MIL-D-70327
2. MACHINE ITEM ◯ TO PROVIDE THE FOLLOWING CHARACTERISTICS:
   a. ZERO END PLAY UNDER 5 LBS AXIAL THRUST
   b. MAX STARTING TORQUE 10 INCH OUNCES
3. MACHINE ITEMS 14, 26 AND 27 AS REQUIRED TO ADJUST THE OPTICAL AXIS PERPENDICULAR TO THE MOUNTING PLANE (THE PLANE CREATED BY THE THREE BALL SEATS) WITHIN 2 ARC SECONDS.
4. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT RETICLE. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 4, COVER FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS 1 AND 4.
5. THE CONDITIONS OF NOTE 4 SHALL BE OBTAINED BY MACHINING OF SPACER DRAWING 1022285 WHICH IS ITEM 4 ON DWG 1022860 AND SECURING THE LENS HOLDER ASSY, 1022854 OF THE SAME ASSY TIGHT AGAINST THIS SPACER, VIBRATION PROOF PART NO. 1022854 USING TWO DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE 'H'
6. SELECT BEARINGS FOR NOMINAL FITS.
7. FOR SHIPPING AND STORAGE, INSTALL THIS UNIT IN PART NO. 1019729-011
8. RETICLE TO BE ALIGNED WITH OPTICAL CENTER WITHIN 2 ARC SECONDS

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A2		REVISED PER ECP 112134 TDRR 20180 DATE 6/15/65	7-12-65	
B		REVISED PER ECP 109584 TDRR 20558 DATE 6/29/65	7-12-65	



LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	1		1019729-011	02386900150		CASE STORAGE ASSY (SEE NOTE 7)			
28	1		1022223	03386910223		COVER			
27	1		1022862-011	02386910321		INSERT, BALL MOUNT, LINE, ASSY OF			
26	1		1022863-011	02386910322		INSERT, BALL MOUNT, LINE, ASSY OF			
(A2) 25	1		1004263-307	03386911164		PLATE IDENTIFICATION			
24	1		1022142-2	03386910142		PLATE, COVER			
23	4		AN960C816	14468051010		WASHER, FLAT			
22	1		1022138-1	03386910137		COUNTERWEIGHT			
21	1		1022138-2	03386910138		COUNTERWEIGHT			
20	1		1022802-011	02386910081		BOLT ASSY			
19	3		MS35691-810	74443117009		NUT, HEX			
18	38		1352004LL8	74455157015		SCREW, SOC HD CAP SELF LOCKING			
17	1		1022256	03386911092		WASHER, SPRING			
16	1		1022823-011	02386910096		EYEPIECE (SXT) ASSY			
15	1		1011773-2			SCREW, SET FLAT (NYLON) POINT			
14	1		1022299	03386911124		INSERT, BALL MOUNT STATIONARY			
13	1		1022142-1	03386910141		PLATE, COVER			
12	1		MS16625-90			RING, RETAINING			
11	1		1022130	03386910131		RETAINER, BEARING			
10	1		1022269	03386911094		RING, LOCKING OUTER			
9	1		1022270	03386911095		SPACER			
8	1		1022139	03386910134		CASE, ROUND			
7	1		1022800-011	02386910079		RETICLE ASSY			
6	2		1012506-2			BEARING, BALL			
5	1		1022141	03386910136		TUBE, TELESCOPE			
4	1		1022136	03386910974		COVER			
3	1		1022860-011	02386910347		SEXTANT EYEPIECE ASSY			
2	1		1022859-011	02386910346		LENS HOLDER ASSY SEXTANT TELESCOPE			
1	1		1022137			BASE, HOUSING			
	-011								

NEXT ASSY	USED ON
	1016910

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910027
DRAWN K. Smith DATE 3-25-65
CHECKED B. Tenteil 3-31-65
APPROVAL 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

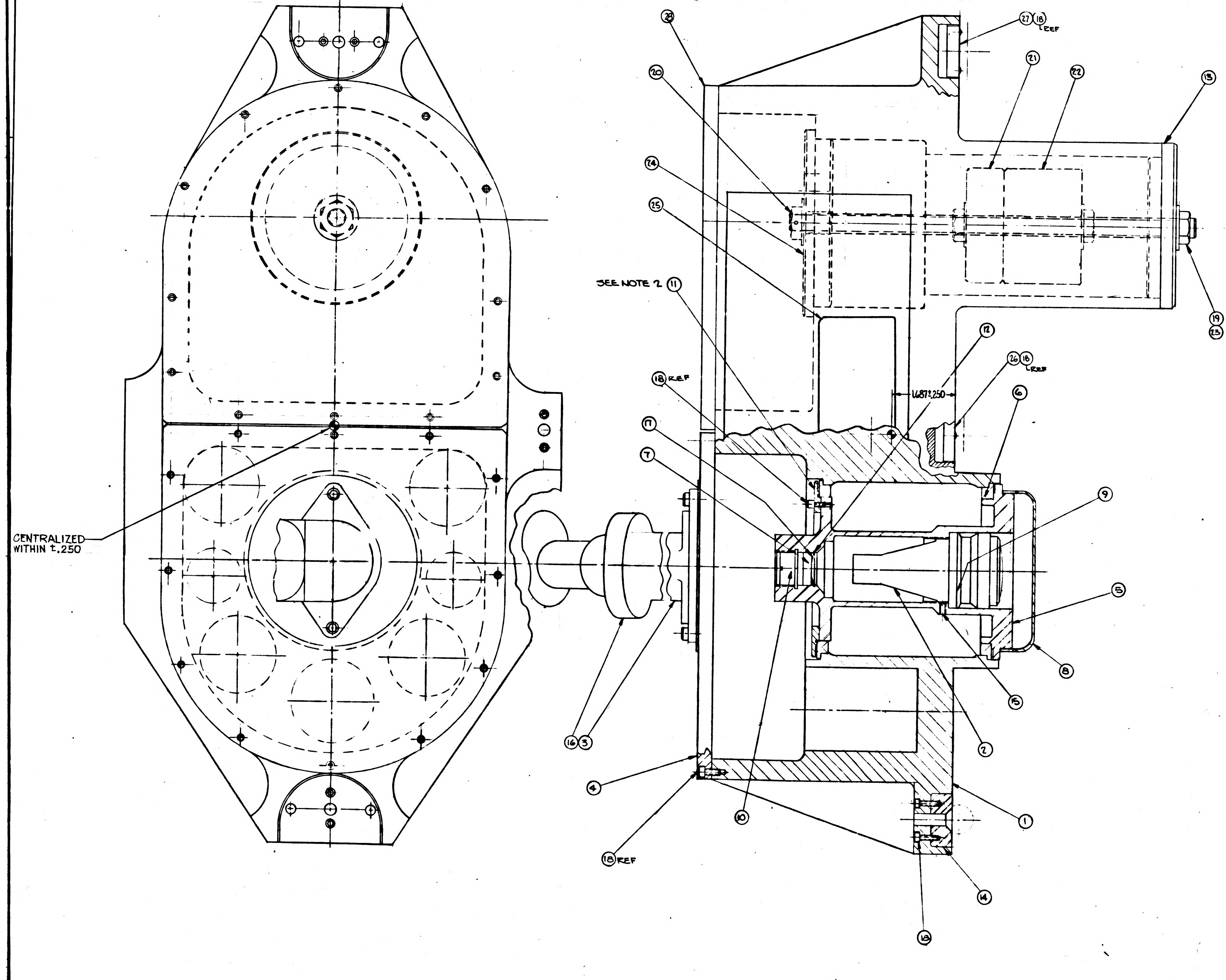
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
YOKE POSITION
FIXTURE

CODE IDENT NO. 39944
SIZE E
NASA NUMBER 1019969
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. MACHINE ITEM ⑪ TO PROVIDE THE FOLLOWING CHARACTERISTICS:
   a. ZERO END PLAY UNDER 5 LBS AXIAL THRUST
   b. MAX STARTING TORQUE 10 INCH OUNCES
3. MACHINE ITEMS 14, 26 AND 27 AS REQUIRED TO ADJUST THE OPTICAL AXIS PERPENDICULAR TO THE MOUNTING PLANE (THE PLANE CREATED BY THE THREE BALL SEATS) WITHIN 2 ARC SECONDS.
4. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT RETICLE. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 4, COVER FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS 1 AND 4.
5. THE CONDITIONS OF NOTE 4 SHALL BE OBTAINED BY MACHINING OF SPACER DRAWING 1022285 WHICH IS ITEM 4 ON DWG 1022860 AND SECURING THE LENS HOLDER ASSY, 1022854 OF THE SAME ASSY TIGHT AGAINST THIS SPACER, VIBRATION PROOF PART NO. 1022854 USING TWO DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE "H"
6. SELECT BEARINGS FOR NOMINAL FITS.
7. FOR SHIPPING AND STORAGE, INSTALL THIS UNIT IN PART NO. 1019729-011
8. RETICLE TO BE ALIGNED WITH OPTICAL CENTER WITHIN 2 ARC SECONDS

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	1		1019729-011	02386900130		CASE, STORAGE ASSY (SEE NOTE 7)			
28	1		1022223	03386910223		COVER			
27	1		1022862-011	02386910321		INSERT, BALL MOUNT, LINE, ASSY OF			
26	1		1022863-011	02386910322		INSERT, BALL MOUNT, LINE, ASSY OF			
25	1		PENDING	PENDING		PLATE IDENTIFICATION			
24	1		1022142-2	03386910142		PLATE, COVER			
23	4		AN960C816	74468051010		WASHER, FLAT			
22	1		1022138-1	03386910137		COUNTERWEIGHT			
21	1		1022138-2	03386910138		COUNTERWEIGHT			
20	1		1022802-011	02386910081		BOLT ASSY			
19	3		MS35691-810	74443117009		NUT, HEX			
18	38		NS52004LL8	74455157015		SCREW, SOC HD CAP SELF LOCKING			
17	1		1022256	03386911092		WASHER, SPRING			
16	1		1022823-011	02386910096		EYEPIECE (SXT) ASSY			
15	1		1011773-2			SCREW, SET FLAT (NYLON) POINT			
14	1		1022299	03386911124		INSERT, BALL MOUNT STAIONARY			
13	1		1022142-1	03386910141		PLATE, COVER			
12	1		MS16625-90			RING, RETAINING			
11	1		1022130	03386910131		RETAINER, BEARING			
10	1		1022269	03386911094		RING, LOCKING OUTER			
9	1		1022270	03386911095		SPACER			
8	1		1022139	03386910134		CASE, ROUND			
7	1		1022800-011	02386910079		RETICLE ASSY			
6	2		1012506-2			BEARING, BALL			
5	1		1022141	03386910136		TUBE, TELESCOPE			
4	1		1022136	03386910974		COVER			
3	1		1022860-011	02386910347		SEXTANT EYEPIECE ASSY			
2	1		1022859-011	02386910346		LENS HOLDER ASSY SEXTANT TELESCOPE			
1	1		1022137			BASE, HOUSING			
	-011								

LIST OF PARTS AND MATERIALS

	1016910
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910027
DRAWN K Smith DATE 3-2-65
CHECKED B Wertenteil 3-31-65
APPROVAL 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
YOKE POSITION
FIXTURE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019969
SCALE 1:1
WEIGHT CALC ACTUAL
SHEET 1 OF

APOLLO G&N Specification
PS 1019969 Rev. -
Original Issue Date:
Release Authority: TDRR 19003
Class A **Release**

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS

YOKE POSITION FIXTURE

DRAWING NO. 1019969

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 8 inclusive.

APPROVALS	NASA/MSC	5/11/65 5-11-65 MIT/IL	KIC

retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions.

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° C ± 10° C

(b) Relative Humidity: 90% max.

(c) Barometric Pressure: 23 to 32 inches of Hg.

4.2 Acceptance Tests.

4.2.1 Teststance Test

4.2.1.1 Perpendicularity of the optical axis to the mounting plane (the plane created by the three ball seats) of the Yoke Position Fixture within 2 arc seconds.

4.2.1.1.1 An Instrument Mounting Plate Assembly (Dwg. 1016913) or equivalent will be placed on four precision blocks, (equal in height to .000050 in.) mounted on a precision granite surface plate, (flat to .000010). The above items are not supplied as part of this assembly.

4.2.1.1.2 The Yoke Position Fixture will be mounted on the Instrument Mounting Plate Assembly using three certified precision balls (Dwg. 1019156) or equivalent (not supplied as part of this assembly) as the interface.

4.2.1.1.3 Using a Turntable Mirror (Dwg. 1016912) or equivalent (not supplied as part of this assembly), mounted on the surface plate, in conjunction with the optics of the Yoke Position Fixture, a series of readings of the relation of the autocollimated image to the reticle will be taken with the shaft at 4 positions approximately 90° apart. These readings will be repeated with the mirror rotated 180° on the surface plate.

4.2.1.1.4 The parallelism of the ball seat plane (of the Instrument Mounting Plate Assembly) to the surface plate will be measured using and electronic indicator and a correction factor will be applied to the readings taken in paragraph 4.2.1.1.3.

4.2.1.1.5 The measurements will be performed on 4 different sections of the surface plate. The four sets of data will be averaged and shall not exceed 2 arc seconds of perpendicularity of optical axis to plane created by the ball inserts in the Yoke Position Fixture.

4.2.2 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Fixture to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing specified in section 2, and shall include determination of at least the following:

1. Size, dimension, tolerance, appearance and markings.
2. Adequacy of materials, parts, and subassemblies, compliance with specific ratings and conformance to applicable specifications.
3. Finish, coatings, construction, markings, and nameplates, as applicable.
4. Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.
5. Workmanship and cleanup.

4.3 Special Tests. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell off to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representatives, and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Alignment data taken on a Precision Test Fixture with the Yoke Position Fixture shall be compatable with the data taken on the same Precision Test Fixture utilizing the Interim Yoke Position Fixture. (1019855)

5. PREPARATION FOR DELIVERY

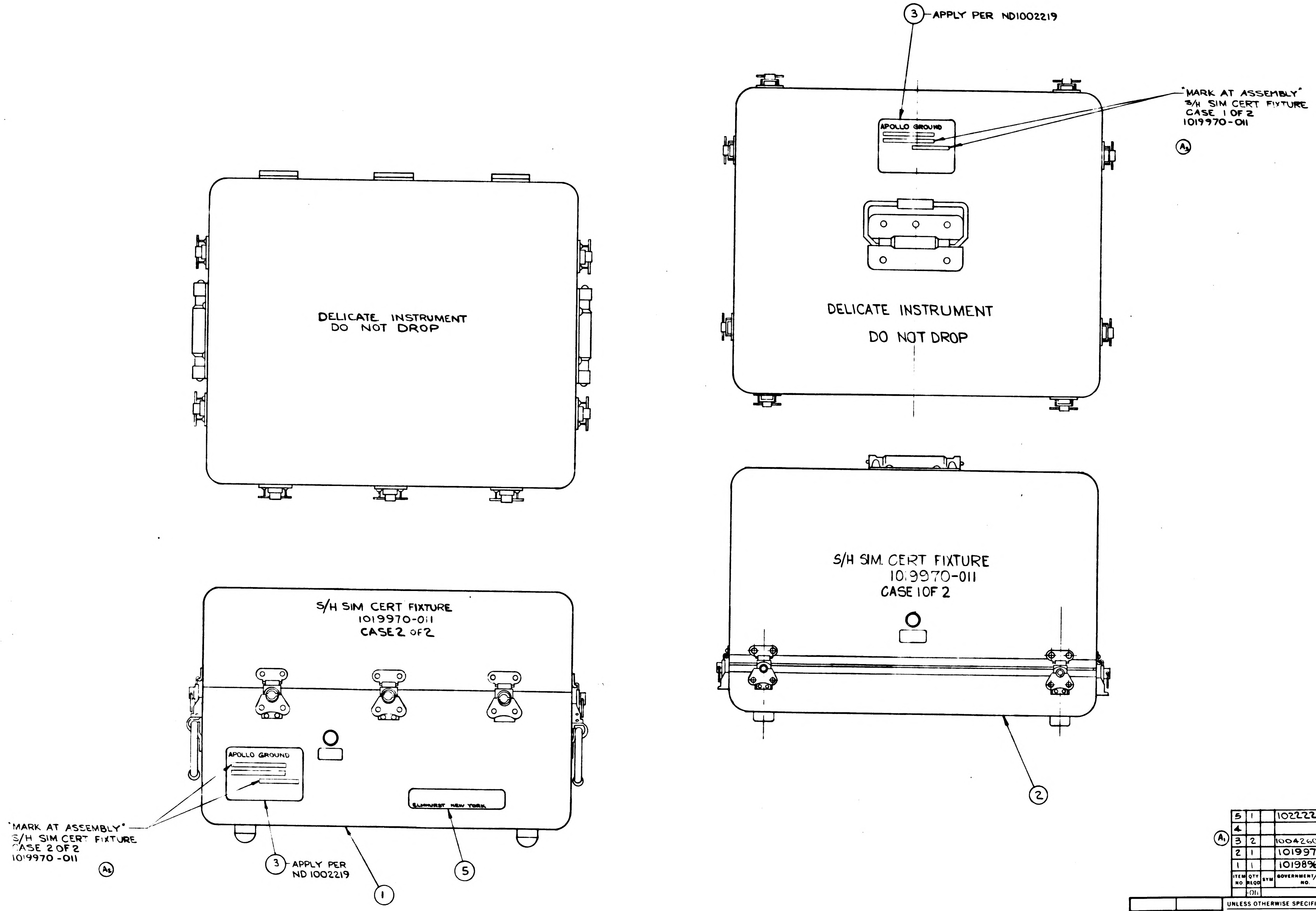
5.1 Preservation and Packaging. The Fixture shall be preserved and packaged in accordance with ND 1002214.

6. NOTES

6.1 The special test designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced therein.

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. UNIT TO BE FURNISHED WITH TRITIUM DECAY CHARTS.

REVISIONS TDRR 19566				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A₃		REVISED PER ECO 109084 TDRR 20895 DATE 7-14-65	M.S. 7-23-65	WM


③ APPLY PER ND1002219
"MARK AT ASSEMBLY"
S/H SIM CERT FIXTURE
CASE 1 OF 2
1019970-011
A₃
APOLLO GROUND
DELICATE INSTRUMENT
DO NOT DROP
DELICATE INSTRUMENT
DO NOT DROP
S/H SIM. CERT FIXTURE
1019970-011
CASE 1 OF 2
②
S/H SIM CERT FIXTURE
1019970-011
CASE 2 OF 2
APOLLO GROUND
ELMHURST NEW YORK
"MARK AT ASSEMBLY"
S/H SIM CERT FIXTURE
CASE 2 OF 2
1019970-011
A₃
③ APPLY PER ND 1002219
①
⑤

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		1022227	17000011130		PLATE, CAUTION			
4									
3	2		1004260-307			NAMEPLATES, APOLLO GEN/GSE (STANDARDS)			
2	1		1019971-011	0 386310053		PHOTOVOLT MULTIPLIER ASSY			
1	1		1019896-011	02336510180		S/H SIMULATOR CERTIFICATION ASSY			
	-011	LIST OF PARTS AND MATERIALS							

A₁

NEXT ASSY	USED ON
	1019960
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT —

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0 38631 0059
DRAWN T. LOMNITZ DATE 1-6-
CHECKED E. J. ROHL 4-28-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
S/H SIMULATOR
CERTIFICATION FIXTURE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019970
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

APOLLO G&N Specification
PS 1019970 Rev. A
Original Issue Date: 6/11/65
Release Authority: TDRR 20047
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS FOR THE STAR-HORIZON SIMULATOR CERTIFICATION FIXTURE

DRAWING NO. 1019970

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
7/14/65	A	20905	7, 8, 9	W. K.	A. M.

This specification consists of page 1 to 10 inclusive.

APPROVALS	6-11-65 NASA/MSC	6/8/65	11 June 65 MIT/IL	June 11 65	6-7-65 6-7-65 KIC 6-7-65

4.2.3 Utilizing calibrated neutral density filters or symmetrical attenuating masks between the Normal Probe (1019944) and a light source, verify the linearity of the photometer to be within ± 2% as read on the microammeter.

> NOTE: Any calibrated neutral density filter used in conjunction with the tests described herein shall have been certified within the previous six-month period.

4.2.4 By varying the intensity of a light source or its distance from the Normal Probe (1019944), vary the photometer microammeter reading from minimum to maximum. The photometer remote output signal shall correspond to the meter reading within 1.2% when 5 V is assumed as full scale.

4.2.5 By utilizing a theodolite or presenting certification data, verify that the field of view of the Normal Probe (1019944) is 23 arc minutes or less. The Normal Probe field of view shall be recorded. The field of view shall be centered within ± 30 arc seconds of the optical axis.

4.2.6 By utilizing a theodolite or presenting certification data, verify that the aperture in the Star Calibration Unit (1019945) is centered within 1 arc minutes.

4.2.7 The Star-Horizon Simulator Certification Fixture shall be calibrated using the Star Calibration Unit (1019945) and Light Stop (1022147) as shown in Figure 1.

4.2.8 The Star-Horizon Simulator Certification Fixture shall be calibrated using the Background Calibration Unit (1019950) and Filter and Light Stop Assembly (1022933) with Light Stop (1022147), as shown in Figure 2.

4.2.9 Check the Reference Mirror (1001767) for flatness. The mirror should be flat to 1/4 fringe or better at 5461 A for any 5 inch diameter area excluding the peripheral 1/4 inch of the mirror.

4.2.10 Ascertain that proper certification is available for the following:

4.2.10.1 Star Calibration Unit (1019945) – absolute accuracy to an AO star (11, 200°K effective color temperature) within ± 15%.

4.2.10.2 Background Calibration Unit (1019950) – absolute accuracy within ± 17%.

4.2.10.3 Filter (1001763) – Transmittance Curve per SCD.

4.2.10.4 Background Calibration Unit (1019950) – Decay chart.

4.2.10.5 Star Calibration Unit (1019945) – Decay chart.

4.2.11 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Star-Horizon Simulator Certification Fixture to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing specified in section 2, and shall include determination of at least the following:

Size, dimension, tolerance, appearance, and markings

Adequacy of materials, parts, and subassemblies, compliance with specific ratings and conformance to applicable specifications

Finish, coating, construction, markings, and nameplates, as applicable

Wiring, cabling, soldering, color coding, and terminals, as applicable

Workmanship and cleanup

4.3 Special Tests. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests as outlined below, prior to sell off to determine compatibility with prime mission.

4.3.1 Measure the star magnitudes within ± 18% of the Star-Horizon Simulator (1019977) 6 arc second star from a + 3.3 S-4 magnitude to a – 0.0 S-4 magnitude.

4.3.2 Measure the magnitude of the Star-Horizon Simulator (1019977) 30 arc second star.

4.3.3 Measure the radiance of the Star-Horizon Simulator (1019977) 30 arc minute Horizon over the 6 to 1 range of intensity.

4.3.4 Verify thermal stability of the Background Calibration Unit (1019950) or Star Calibration Unit (1019945) and the Normal Probe (1019944) and Photovolt Multiplier Assembly (1019971) to be better than ± 1% when subjected to continuous monitoring for a period of 4 hours in an ambient temperature which varies from 67°F through 77°F.

4.3.5 Utilizing the Reference Mirror (1001767) in conjunction with the Star-Horizon Simulator (1019977) and Auxiliary Precision Test Fixture (1019962), determine the parallelism of the lines of sight of the Light Beam Deflectors (1019909, 1019913) within 4 arc seconds over the temperature range of 67°F through 77°F.

4.3.6 Verify mechanical fit of the Star-Horizon Simulator Certification Fixture to the Auxiliary Precision Test Fixture (1019962) and the Star-Horizon Simulator Mounting Fixture (1019926) in the normal test configurations of 0° and 15° tilt angles.

4.3.7 Verify alignment of the Star-Horizon Simulator (1019977) and the Star-Horizon Simulator Certification Fixture over the temperature range of 67°F through 77°F on the Auxiliary Precision Test Fixture (1019962).

4.3.8 Verify that the Normal Probe (1019944) output is constant within ± 2% within the central 8 arc minutes of its field of view.

4.3.9 The 6 arc second star magnitude specified in paragraph 3.1.1 shall be measured at the calibration aperture of the SLOS-TLOS Light Beam Deflector (1019913). A reflectance factor shall be supplied for measurement at the star tracker aperture of the Light Beam Deflector (1019913) to account for variations in light due to the reflectivity of mirrors.

APOLLO G&N Specification
PS 1019970 Rev. B
Original Issue Date: 6/11/65
Release Authority: TDRR 20047
Class A Release

PROCUREMENT SPECIFICATION
PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS FOR THE STAR-HORIZON SIMULATOR CERTIFICATION FIXTURE

DRAWING NO. 1019970

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
A 7/14/65	A	20905	7, 8, 9	W. K.	A. M.
12/21/65	B	24837	2 through 16	W. K.	[illegible] M.

This specification consists of page 1 to 16 inclusive.

APPROVALS				
6-11-65 NASA/MSC	6/8/65	11 June 65 MIT/IL	June 11 65	6-7-65 6-7-65 KIC 6-7-65

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator Certification Fixture, Part Number 1019970-011.

2. APPLICABLE DOCUMENTS

2.1 **Effective Issues.** The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements for,
ND 1002023	Serialization, General Specification for

DRAWINGS

APOLLO G&N

1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1001767	Mirror, Reference
1019944	Normal Probe
1019945	Star Calibration Unit
1019950	Background Calibration Unit
1022957	Filter Assembly
1022147	Light Stop
1019971	Photovolt Multiplier Assembly
1019913	Deflection Mirror Assembly
1019909	Deflection Mirror Assembly
1019919	Sliding Platform Assembly
1019949	Calibration Adapter Mount Assembly

1019544	Light Stops
1022484	Symetrical Attenuating Mask
1022485	Symetrical Attenuating Mask
1022486	Symetrical Attenuating Mask

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 **Conflicting Requirements.** In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined. ℓ

a. The Contract

b. This Specification

c. Documents listed in this section

3. REQUIREMENTS

3.1 Performance

3.1.1 Star Magnitude Certification

3.1.1.1 The absolute value of the Star Calibration Unit (1019945-011) shall be known to an accuracy of ± 15% as referenced to an Ao star (11,200°K effective color temperature) by means of the Langley method.

3.1.2 Horizon Calibration.

3.1.2.1 The Star Horizon Simulator Certification Fixture shall be calibrated with a standard of spectral irradiance employing a plaque coated with magnesium oxide as a diffuse reflector. The plaque shall have a minimum area of two times that area subtended by the Normal Probe (1019944-011) at the calibration distance. The absolute value of the spectral irradiance standard shall be known to an accuracy of ± 17%.

3.1.3 **External Output.**

3.1.3.1 The Star-Horizon Simulator Certification Fixture shall provide an external 0 to 6 volt maximum dc signal, linear within ± 1.2% to the indicated deflection on the Photovolt Multiplier Assembly (1019971-011). The scale deflections shall be:

0 Volts ± 10mv = meter zero
4.5 to 6 Volts = meter full scale

3.1.4 **Linearity.**

3.1.4.1 The Star-Horizon Simulator Certification Fixture output shall be linear within ± 2% as read on the Photovolt Multiplier Assembly (1019971-011).

3.1.5 **Mirror Flatness.**

3.1.5.1 The Reference Mirror (1001767-011) shall be flat to 1/4 fringe or better, at 5461 Å, for any 5 inch surface area of the mirror excluding the peripheral 1/4 inch.

3.1.6 **Aperture.**

3.1.6.1 The Star Calibration Unit (1019945-011) aperture shall be centered within 1 arc minute.

3.1.7 **Field of View.**

3.1.7.1 The Normal Probe (1019944-011) field stop shall be 23 arc minutes maximum, centered within ± 30 arc seconds of the Normal Probe optical axis.

3.1.8 **Decay Charts.**

3.1.8.1 Tritium decay charts shall be provided for the Star Calibration Unit (1019945-011) and for the Background Calibration Unit (1019950-011).

3.1.9 **Background Calibration Unit Output.**

3.1.9.1 The Background Calibration Unit (1019950-011) shall produce between 0.015 and 0.050 candles/ft^2 including the tritium decay factor (at sell-off).

3.1.9.2 The Background Calibration Unit (1019950-011) shall produce a scale reading of 50 units minimum when the Photovolt Multiplier (1019971-011) voltage selector is set to position 1.

3.1.10 Star Calibration Unit Output.

3.1.10.1 The Star Calibration Unit (1019945-011) shall produce a S-4 photoelectric star magnitude between +2.7 and +3.9 including the tritium decay factor (at selloff).

3.1.10.2 The Star Calibration Unit (1019945-011) shall produce a scale reading of 15 minimum on the Photovolt Multiplier (1019971-011) when:

a. The Photovolt Multiplier voltage selector is set to position 3, and

b. The Light Stop (1022147-011) is interposed and properly oriented between the Star Calibration Unit (1019945-011) and the Normal Probe (1019944-011).

3.1.11 Calibration Curves.

3.1.11.1 A calibration curve in (watts/cm^2/steradian/Å) vs. Å shall be provided for the spectral irradiance source which was utilized to calibrate the Star-Horizon Simulator Certification Fixture (reference para. 3.1.2) at the calibration current utilized in para. 3.1.2. (Only required for 3100-3900 Å). *

*The region defined by the 1% transmission points of the calibration filter.

3.1.11.2 A calibration curve of filter transmissibility vs. wavelength, in the 3100-3900 Å region, shall be provided for the Filter Assembly (1022957-011). This same filter assembly shall have been utilized in para. 3.1.2.

3.1.12 Energy Number.

3.1.12.1 A number shall be provided representing the energy passing through the filter specified in paragraph 3.1.11.2 from the standard of spectral irradiance shown in Figure 1. This number shall be computed as:

$$S_\lambda T_\lambda = \sum_{m=0}^{m=28} S_{3200+25m} \; T_{3200+25m} \Delta\lambda \left[\frac{R_{MgO}}{\pi}\right]$$

This is the spectral irradiance (S) of the lamp (watts/cm^2/steradian/Å) at a given wavelength multiplied by the filter transmission (T) at that wavelength. Subscripts indicate wavelength in angstroms. $\Delta\lambda$ is the wavelength interval; i.e. 25 Å. R_{MgO} is the diffuse reflectance factor i.e. 97%.

3.1.13 **Filter Factor**

3.1.13.1 A number shall be provided which represents the total energy passing through a filter whose curve of transmission vs. wavelength is depicted in Figure 2 from the spectral irradiance curve depicted in Figure 1.

3.1.14 Special Requirements. These tests shall be performed only on the first article produced by the vendor to assure compliance with prime mission requirements as specified herein.

3.1.14.1 Simulator 6 Arc Sec Star Magnitude. The Star-Horizon Simulator Certification Fixture shall measure the S-4 star magnitudes of the 6 arc second star of the Star-Horizon Simulator (Ref. PS 1019977) over the range -4.0 to +4.0. The foregoing star magnitudes shall be measured at, or compensated for measurement at, the exit aperture of the Star Tracker LOS mirror of Deflection Mirror Assembly (1019913-011). Compensating factors shall include use of Light Stop (1022147-011), mirror reflectivity, and tritium decay factors. Care shall be taken that the orientation of the Normal Probe (1019944-011) to the Light Stop (1022147-011) is identical to the orientation of the Normal Probe (1019944-011) to the Deflection Mirror Assembly (1019913-011) aperture.

3.1.14.2 The Star-Horizon Simulator Certification Fixture shall measure the output of the 30 are second star of the Star-Horizon Simulator (1019977-011 Ref.) within the spectral region defined by the 1% transmission characteristics of the Filter Assembly 1022957-011.

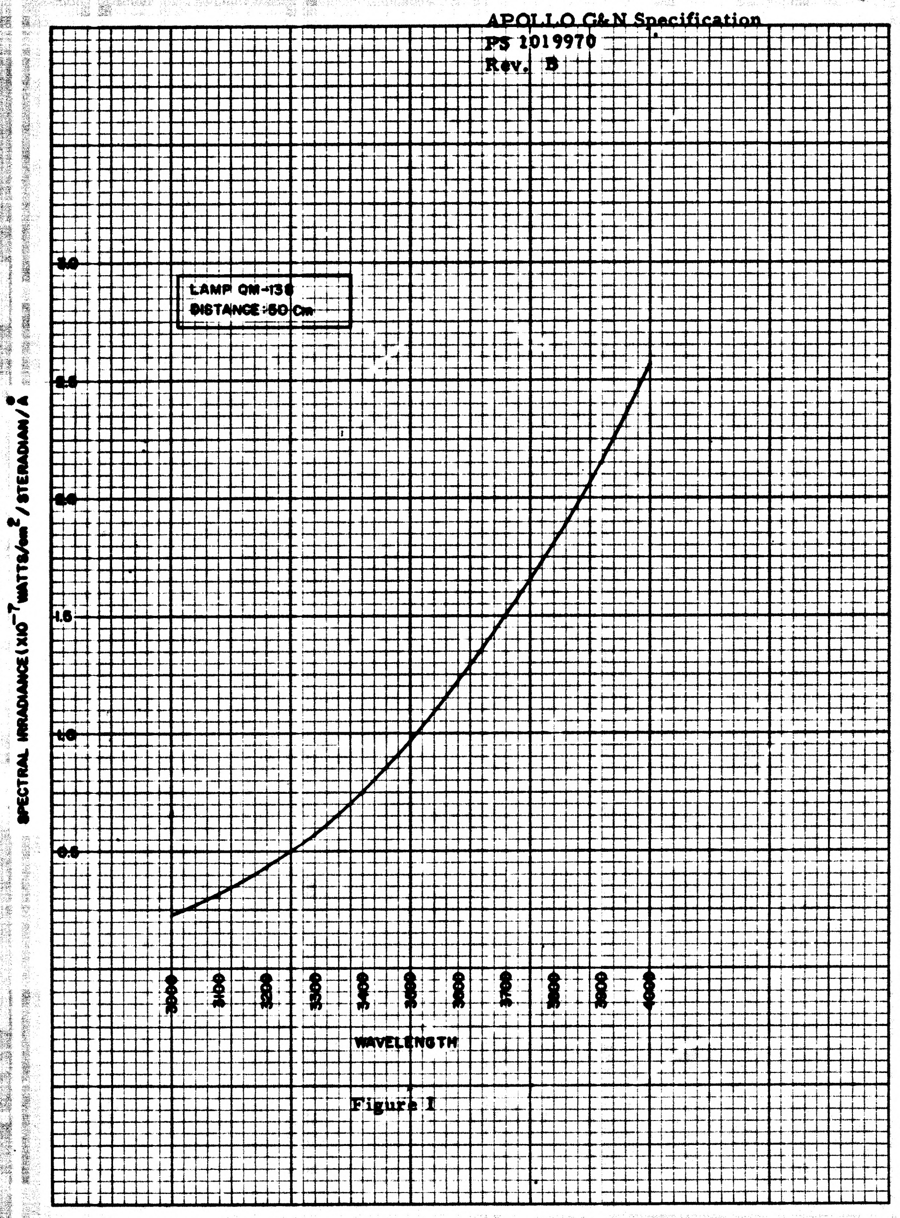
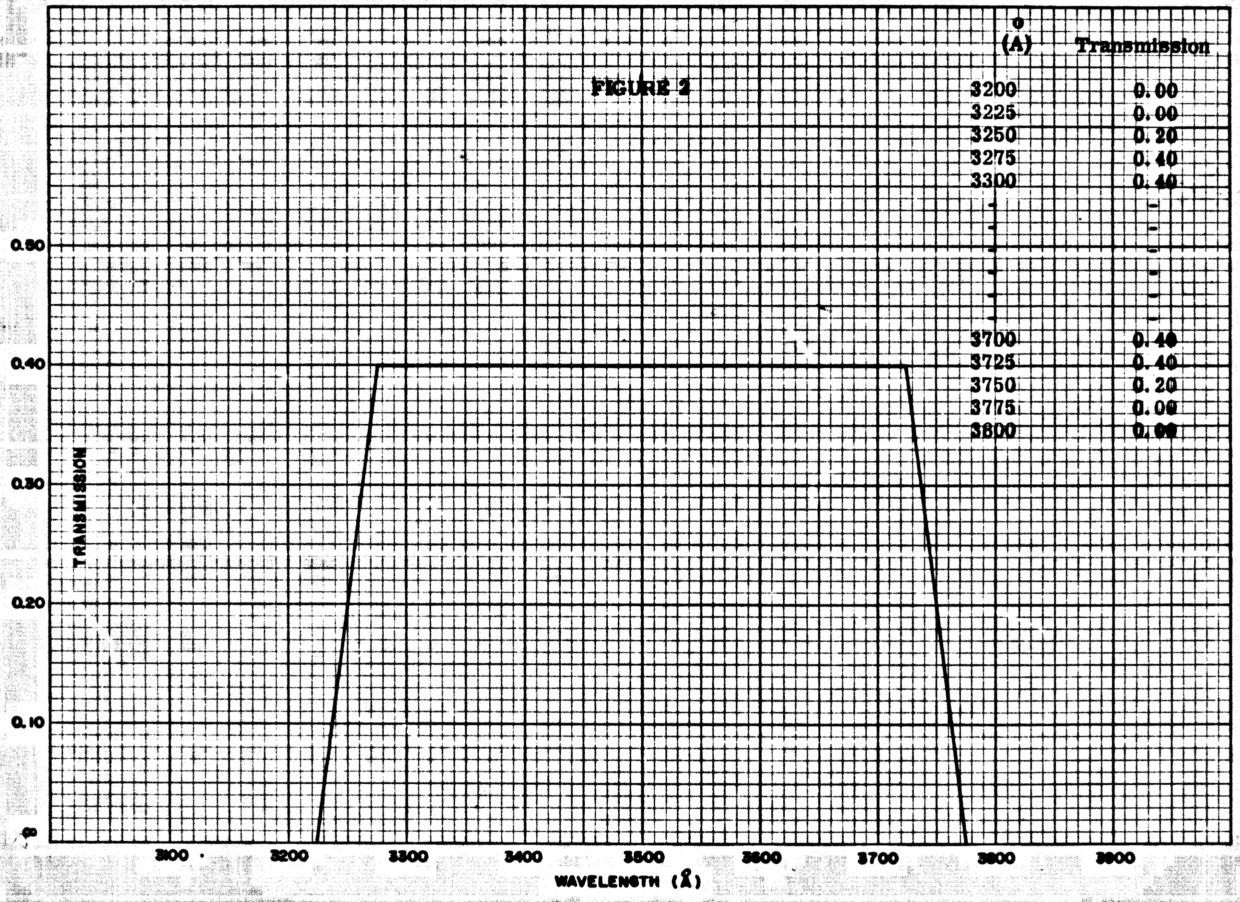

K+E 10 X 10 TO THE INCH 46 0782
KEUFFEL & ESSER CO.
SPECTRAL IRRADIANCE (X10^-7 WATTS/cm^2/STERADIAN/Å
LAMP QM-136
DISTANCE: 50 Cm
3.0
2.5
2.0
1.5
1.0
0.5
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
WAVELENGTH

Figure I

K+E 10 X 10 TO THE INCH 46 0782
KEUFFEL & ESSER CO.

FIGURE 2



(Å)	Transmission
3200	0.00
3225	0.00
3250	0.20
3275	0.40
3300	0.40
-	-
-	-
-	-
-	-
-	-
-	-
3700	0.40
3725	0.40
3750	0.20
3775	0.00
3800	0.00

3.1.14.3 Simulator Horizon Intensity. The Star-Horizon Simulator Certification Fixture shall be capable of measuring the spectral intensity of the Horizon of the Star Horizon Simulator (Ref. PS 1019977) over the continuous interval bounded by 4.5×10^{-4} watts/cm^2/steradian and 1.1×10^{-4} watts/cm^2/steradian. The spectral intensity distribution shall be limited by the filter (P/N 1022957) 1% (one percent) transmission points (approximately encompassed by the wavelength interval 3100Å - 3900 Å). The horizon intensity expressed in watts/cm^2/steradian divided by the theoretical effective bandwidth of the filter 1022957, i.e. 200 Å, shall be the energy in watts/cm^2/steradian/Å at the theoretical center frequency, i.e. 3500 Å, of the filter (1022957). The horizon intensity measurement shall account for tritium decay.

3.1.14.4 Filter Factors. The validity of the filter factors shall be demonstrated by verifying that the ratio of theoretical values computed as in paragraph 3.1.12 utilizing Figure 1 as a reference lamp are identical within ± 12% of the ratios obtained experimentally while utilizing the Star-Horizon Simulator (1019977-011 Ref.) as a source. The central wavelength of the two filters should be separated as much as practicable (based on available supply of filters).

3.2 Product Configuration.

3.2.1 Drawings. The configuration of the assembly shall be in accordance with the Apollo G and N Drawing 1019970 and all drawings and engineering data referenced thereon.

3.2.2 Serialization. Each assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023.

4. QUALITY ASSURANCE PROVISIONS.

4.1 General. The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

Product Performance and Configuration Requirements/Quality Assurance Reference Index:

Performance Requirements	Paragraph Title	Test Verification
3.1.1.1	Star Magnitude Certification	4.2.1.1
3.1.2.1	Horizon Calibration	4.2.2.1
3.1.3.1	External Output	4.2.3.1
3.1.4.1	Linearity	4.2.4.1
3.1.5.1	Mirror Flatness	4.2.5.1
3.1.6.1	Aperture	4.2.6.1
3.1.7.1	Field of View	4.2.7.1
3.1.8.1	Decay Charts	4.2.8.1
3.1.9.1		
3.1.9.2	Background Calibration Unit Output	4.2.9.1, 4.2.9.2
3.1.10.1		
3.1.10.2	Star Calibration Unit Output	4.2.10.1, 4.2.10.2
3.1.11.1	Calibration Curves	4.2.11.1
3.1.12.1	Energy Number	4.2.12.1
3.1.13.1	Filter Factor	4.2.13.1
3.1.14	Special Requirements	4.3
3.1.14.1	Simulator 6 Arc Sec. Star Magnitude	4.3.1
3.1.14.2	Simulator 30 Arc Sec. Star Output	4.3.2
3.1.14.3	Simulator Horizon Radiance	4.3.3
3.1.14.4	Filter Factors	4.3.4
3.2	Product Configuration	4.4

4.1.1 The failure of an end product to pass any examination or test of this section will automatically classify the unit as nonconforming, When nonconforming units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or when so directed by the cognizant inspector, a complete reexamination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. **Temperature:** 72° ± 10°F

b. **Relative Humidity:** 90% maximum

c. **Barometric Pressure:** 28 to 32 inches Hg.

4.2 Tests.

4.2.1 Star Magnitude Certification

4.2.1.1 Present pre-acceptance certification data of the absolute value of the Star Calibration Unit (1019945-011) determined by means of the Langley method.

4.2.2 Horizon Calibration.

4.2.2.1 Present pre-acceptance certification data of the Star-Horizon Simulator Certification Fixture calibration utilizing a standard of spectral irradiance. The experimental configuration used for calibration shall consist of a magniesium oxide coated plaque irradiated by a source of energy whose calibration is traceable to the National Bureau of Standards.

The number of photometric units, $P.U._{\text{Horizon}}$, required to simulate a horizon intensity of $4.5 (10^{-4})$ watts/cm^2/steradian as seen through the filter whose curve is referenced in paragraph 3.1.11.2 shall be computed using the equation.

$$P.U._{\text{Horizon}} = P.U._{\text{Irradiance}} \quad \frac{4.5\ (10^{-4})}{S_\lambda \quad T_\lambda} \ \text{W/cm}^2\text{/steradian}$$

S_λ T_λ is expressed in W/cm^2/steradian and is referenced in paragraph 3.1.12.1 $P.U._{\text{Irradiance}}$ is the number of photometric units recorded when the Star Horizon Simulator Certification Fixture views the irradiated MgO plague. The Star Horizon Simulator Certification Fixture amplifier gain setting reproducibility is accomplished by using the Background Calibration Unit (1019950-011) as a transfer standard.

4.2.3 External Output.

4.2.3.1 Mount the Normal Probe (1019944-011) and a Star-Horizon Simulator * on a Sliding Platform (1019919-011 Ref.). Verify the linearity of the Photovolt Multiplier Assembly (1019971-011) remote output by utilising a Fluke Model 803 or 825 DC VTVM and adjusting the intensity of the Star-Horizon Simulator to vary the Photovolt Multiplier Assembly indication from minimum to maximum.

* not required to be a certified unit.

4.2.4 Linearity

4.2.4.1 Connect the Normal Probe (1019944-011) and Star Calibration Unit (1019945-011) as a unit. Verify the linearity of the Star-Horizon Simulator Certification Fixture utilising attenuating masks (1022484, 1022485, 1022486) between the Normal Probe and Star Calibration Unit and reading the Photovolt Multiplier Assembly (1019971-011) indication.

4.2.5 Mirror Flatness.

4.2.5.1 Measure the optical flatness of the Reference Mirror (1001767) using an interferometer.

4.2.6 Aperture.

4.2.6.1 Verify the Star Calibration Unit (1019945-011) aperture centering utilizing a theodolite or by presenting certification data.

4.2.7 Field of View.

4.2.7.1 Verify the Normal Probe (1019944-011) field of view utilizing a theodolite or by presenting certification data.

4.2.8 Decay Charts.

4.2.8.1 Verify that tritium decay charts have been provided for the Star Calibration Unit (1019945-011) and the Background Calibration Unit (1019950-011).

4.2.9 Background Calibration Unit Output.

4.2.9.1 Present pre-acceptance certification data of the candles/ft^2 output of the Background Calibration Unit (1019950-011).

4.2.9.2 Connect Normal Probe (1019944-011), and Background Calibration Unit (1019950-011) as a unit. Set Photovolt Multiplier Assembly (1019971-011) voltage selector switch to position 1 and observe Photovolt Multiplier Assembly reading.

4.2.10 Star Calibration Unit Output.

4.2.10.1 Present pre-acceptance certification data to verify the S-4 photoelectric star magnitude output of the Star Calibration Unit (1019945-011).

4.2.10.2 Connect Normal Probe (1019944-011) and Star Calibration Unit (1019950-011) as a unit. Set Photovolt Multiplier Assembly (1019971-011) voltage selector to position 3.

Place and properly orientate Light Stop (1022147-011) between the Star Calibration Unit and the Normal Probe. Observe Photovolt Multiplier Assembly reading.

4.2.11 Calibration Curves.

4.2.11.1 Ascertain that calibration curves are available for the following:

a. Lamp Calibration in (watts/cm^2/steradian/Å) versus Å in the 3100–3900 Å spectral region.

b. Filter transmissibility versus wavelength in the 3200–3900 Å region for the filter assembly utilised in par. 3.1.2.

4.2.12 Energy Number.

4.2.12.1 Ascertain that an energy number representing the energy passing through the Filter Assembly (1022957–011) has been provided. This number shall have been computed per par. 3.1.12.

4.2.13 Filter Factor Number

4.2.13.1 The filter factor shall be computed as:

$$\text{Filter Factor} = \frac{\sum_{3100}^{3900} S_R \; T_V}{\sum_{3100}^{3900} S_R \; T_W}$$

S_R values are referenced to Figure 1.

T_V values are referenced to the curve called out in 3.1.11.2.

T_W values are referenced to Figure 2.

4.3 Special Requirements. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off to determine compatibility with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Simulator 6 Arc Sec. Star Magnitude. Mount the Normal Probe (1019944–011), a Star-Horizon Simulator (1019977–011) and a Deflection Mirror Assembly (1019913–011) on a Sliding Platform (1019919–011 Ref.). Vary the intensity of the Star-Horizon Simulator 6 arc second star between −4.0 and +4.0 star magnitudes and observe the Photovolt Multiplier Assembly (1019971–011) indication.

4.3.2 **Simulator 30 Arc Sec. Star Output.** Mount the Normal Probe (1019944-011) Filter Assembly (1022957-011), and a Star-Horizon Simulator (1019977-011 Ref.) on a Sliding Platform (1019919-011 Ref.). Maximize the intensity of the Star-Horizon Simulator 30 arc second star and observe the output on the Photovolt Multiplier Assembly (1019971-011).

4.3.3 **Horizon Radiance.** Mount the Normal Probe (1019944-011) Filter Assembly (1022957-011), Horizon Simulator (1019977-011 Ref.) on a Sliding Platform (1019919-011 Ref.). Vary the intensity of the Star-Horizon Simulator horizon and observe the output on the Photovolt Multiplier Assembly (1019971-011).

4.3.4 **Filter Factors.** Utilizing Filter Assembly (1022957-011) mounted between the Normal Probe (1019944-011) and a Star-Horizon Simulator (1019977-011 Ref.) observe the output on Photovolt Multiplier Assembly (1019971-011). Mount another Filter Assembly (1022957-011) between Normal Probe and a Star-Horizon Simulator and observe the output on Photovolt Multiplier Assembly. Obtain difference between two outputs, divide difference by larger of two readings and multiply by 100 to obtain percentage. Calculate the difference between theoretical and experimental values.

4.4 **Drawing Compliance and Mechanical and Visual Inspection.** The assembly shall be visually examined for compliance with Apollo G&N drawing 1019970, and all drawings and specifications referenced thereon. The assemblies and subassemblies shall be visually inspected as a minimum for the following.

1. Size, dimension, tolerance, serialization, appearance, and markings.
2. Adequacy of materials, parts, and subassemblies, compliance with specific ratings and conformance to applicable specifications.
3. Finish, coating, construction, markings, and nameplates, as applicable.
4. Wiring, cabling, soldering, color coding, and terminals, as applicable.
5. Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

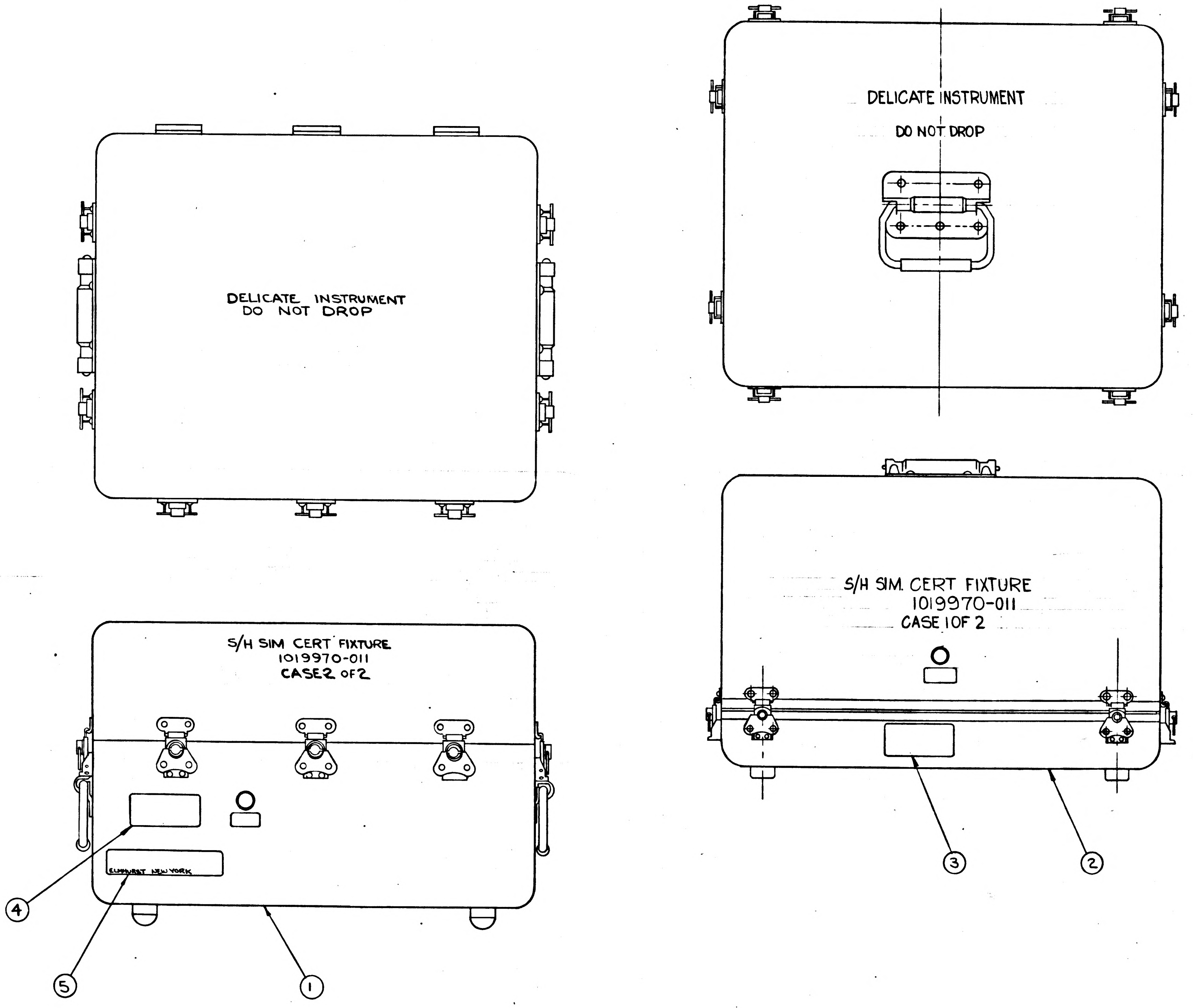
5.1 General Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES.

6.1 Materials Handling. The handling of tritium, a radioactive material, shall be in compliance with state and local regulations and licensing requirements.

REVISIONS TDKK 19860				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG PER MIL-D-70327
2. UNIT TO BE FURNISHED WITH TRITIUM DECAY CHARTS.


DELICATE INSTRUMENT
DO NOT DROP
DELICATE INSTRUMENT
DO NOT DROP
S/H SIM CERT FIXTURE
1019970-011
CASE 2 OF 2
ELMHURST NEW YORK
S/H SIM. CERT FIXTURE
1019970-011
CASE 1 OF 2
④
⑤
①
③
②

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		1022227	17000011130		PLATE, CAUTION			
4	1		1004260-			PLATE, IDENTIFICATION			
3	1		1004260-			PLATE, IDENTIFICATION			
2	1		1019971-011	01386310053		PHOTOVOLT MULTIPLIER ASSY			
1	1		1019896-011	02386310180		S/H SIMULATOR CERTIFICATION ASSY			
	-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
	1900030
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT ——

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 0.38631 0059
DRAWN T.L.DMAUITZ DATE 1-6-64
CHECKED E.J.ROHL 4-28-65
APPROVAL 4-30-6
APPROVAL ——
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
S/H SIMULATOR
CERTIFICATION FIXTURE

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019970
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

W4

APOLLO G&N Specification
PS 1019970 Rev. —
Original Issue Date: 6/11/65
Release Authority: TDRR 20047
Class A Release

PROCUREMENT SPECIFICATION
PRODUCT CONFIGURATION AND ACCEPTANCE REQUIREMENTS FOR THE STAR-HORIZON SIMULATOR CERTIFICATION FIXTURE

DRAWING NO. 1019970

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 10 inclusive.

APPROVALS	6/11-65 NASA/MSC	6/8/65	11 June 65 MIT/IL	June 11 65	6-7-65 6-7-65 KIC 6-7-65

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator Certification Fixture, P/N 1019970

2. APPLICABLE DOCUMENTS

2.1 Effective Issues. The following documents form a part of this specification to the extent specified herein.

2.1.1 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002214	General Specification for Preservation, Packaging, Packing and Container Marking

DRAWINGS

APOLLO G&N

1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1001767	Mirror, Reference
1019971	Photometer, Sub-Assembly Photovolt Multiplier
1019944	Normal Probe
1019945	Star Calibration Unit
~~1019950~~	~~Background Calibration Unit~~
1019949	Calibration Adapter Mount Assembly
~~1022933~~	~~Filter and Light Stop Assembly~~
1022147	Light Stop
~~1001763~~	~~Filter~~
1019962	Aux P.T.F.
1019909	Light Beam Deflector
1019913	Light Beam Deflector
1019926	Star-Horizon Simulator Mounting Fixture

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The Contract

b. This Specification

c. Documents listed in this section

3. REQUIREMENTS

3.1 Performance – The Star-Horizon Simulator Certification Fixture shall be capable of the following:

3.1.1 Measuring the S-4 photoelectric magnitude of the 6 arc second star of the Star-Horizon Simulator (1019977) to an absolute value ± 18%, referenced to an AO star (11, 200°K effective color temperature) at any simulated star magnitude in the range − 0.5 through + 4.0.

NOTE: The absolute value of the Reference Standard shall be known to an accuracy of ± 15%.

✓ 3.1.2 Measuring the horizon intensity of the Star-Horizon Simulator (1019977) in the spectral region 3400-3600 Å to an absolute accuracy (value) ± 20% over the normal 6:1 intensity range of the simulated horizon, and by measuring relative intensities in that region to an accuracy of ± 3%.

3.1.3 Measuring (in conjunction with the Star-Horizon Simulator (1019977)) the parallelism of the mirrors in the Star-Horizon Simulator Light Beam Deflectors (1019909, 1019913) to an accuracy of ± 1 arc second or better.

3.1.4 Providing an external 0 to + 5 volts dc signal linear with ± 1.2% to the reading of the Photometer microammeter. The scale factors shall be

0 VOLTS = Meter zero

5 VOLTS = Full scale

3.2 Product Configuration

3.2.1 Drawings – The configuration of the assembly shall be in accordance with the Apollo G&N Drawing 1019970 and all drawings and engineering data referenced thereon.

3.3 Test Conditions – The Star–Horizon Simulator Certification Fixture shall be capable of performance over a temperature range from 67°F through 77°F.

4. QUALITY ASSURANCE PROVISIONS

4.1 Product Performance and Configuration Requirements/Quality Assurance Cross Reference Index.

Paragraph Title	Performance Requirements	Test Verification
Certification of Star Magnitude	3.1.1	4.2.6, 4.2.7, 4.2.10.1, 4.2.10.5
Certification of Horizon Intensity and Field of View of Photometer Normal Probe	3.1.2	4.2.5, 4.2.8, 4.2.10.2, 4.2.10.3, 4.2.10.4
Certification of Mirror Parallelism	3.1.3	4.2.9
Certification of Photo-Linearity	3.1.4	4.2.3, 4.2.4

Paragraph Title	Performance Requirements	Test Verification
Test Conditions	3.3	4.1.2, 4.2.1, 4.2.2

4.1.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herin.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconforming units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete reexamination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions. The Star-Horizon Simulator Certification Fixture shall be tested in an area in which the temperature can vary from 67°F through 77°F.

4.2 Tests.

4.2.1 Connect the Photometer (1019971) and Normal Probe (1019944) as a unit. Apply 115 volt, 60 cycle power (nominal) to the unit, and verify operation of all controls and indicators.

CAUTION: Maintain SHUTTER control of Normal Probe (1019944) in the CLOSE position.

4.2.2 Verify the mechanical mating of Star-Horizon Simulator Certification Fixture subassemblies in the configurations shown in Figures 1 and 2.

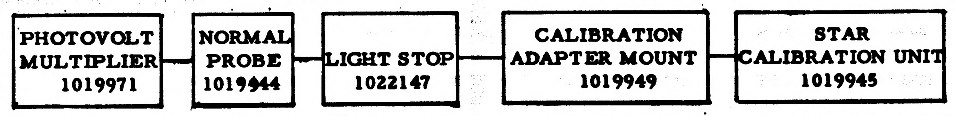

PHOTOVOLT MULTIPLIER 1019971
NORMAL PROBE 1019944
LIGHT STOP 1022147
CALIBRATION ADAPTER MOUNT 1019949
STAR CALIBRATION UNIT 1019945

Figure 1

Connected As An Integral Unit

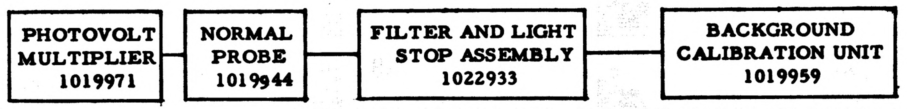

PHOTOVOLT MULTIPLIER 1019971
NORMAL PROBE 1019944
FILTER AND LIGHT STOP ASSEMBLY 1022933
BACKGROUND CALIBRATION UNIT 1019959

Figure 2

Connected As An Integral Unit

4.2.3 Utilizing calibrated neutral density filters or symmetrical attenuating masks between the Normal Probe (1019944) and a light source, verify the linearity of the photometer to be within ± 2% as read on the microammeter.

> NOTE: Any calibrated neutral density filter used in conjunction with the tests described herein shall have been certified within the previous six-month period.

4.2.4 By varying the intensity of a light source or its distance from the Normal Probe (1019944), vary the photometer microammeter reading from minimum to maximum. The photometer remote output signal shall correspond to the meter reading within 1.2% when 5 V is assumed as full scale.

4.2.5 By utilizing a theodolite or presenting certification data, verify that the field of view of the Normal Probe (1019944) is 23 arc minutes or less. The Normal Probe field of view shall be recorded. The field of view shall be centered within ± 30 arc seconds of the optical axis.

4.2.6 By utilizing a theodolite or presenting certification data, verify that the aperture in the Star Calibration Unit (1019945) is centered within 7 arc minutes.

4.2.7 The Star-Horizon Simulator Certification Fixture shall be calibrated using the Star Calibration Unit (1019945) and Light Stop (1022147) as shown in Figure 1.

4.2.8 The Star-Horizon Simulator Certification Fixture shall be calibrated using the Background Calibration Unit (1019950) and Filter and Light Stop Assembly (1022933) with Light Stop (1022147), as shown in Figure 2.

4.2.9 Check the Reference Mirror (1001767) for flatness. The mirror should be flat to 1/4 fringe or better at 5461 A for any 5 inch diameter area excluding the peripheral 1/4 inch of the mirror.

4.2.10 Ascertain that proper certification is available for the following:

4.2.10.1 Star Calibration Unit (1019945) – absolute accuracy to an AO star (11, 200°K effective color temperature) within ± 15%.

4.2.10.2 Background Calibration Unit (1019950) – absolute accuracy within ± 17%.

4.2.10.3 Filter (1001763) – Transmittance Curve per SCD.

4.2.10.4 Background Calibration Unit (1019950) – Decay chart.

4.2.10.5 Star Calibration Unit (1019945) – Decay chart.

4.2.11 Visual and Mechanical Inspection. A comprehensive inspection shall be made of the Star-Horizon Simulator Certification Fixture to determine the extent of compliance with the requirements of this specification and the applicable NASA drawing specified in section 2, and shall include determination of at least the following:

Size, dimension, tolerance, appearance, and markings

Adequacy of materials, parts, and subassemblies, compliance with specific ratings and conformance to applicable specifications

Finish, coating, construction, markings, and nameplates, as applicable

Wiring, cabling, soldering, color coding, and terminals, as applicable

Workmanship and cleanup

4.3 Special Tests. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests as outlined below, prior to sell off to determine compatibility with prime mission.

4.3.1 Measure the star magnitudes within ± 18% of the Star-Horizon Simulator (1019977) 6 arc second star from a + 4.0 S-4 magnitude to a – 0.5 S-4 magnitude.

4.3.2 Measure the magnitude of the Star–Horizon Simulator (1019977) 30 arc second star to be a minimum of __________.

4.3.3 Measure the radiance of the Star–Horizon Simulator (1019977) 30 arc minute Horizon over the 6 to 1 range of intensity.

4.3.4 Verify thermal stability of the Background Calibration Unit (1019950) or Star Calibration Unit (1019945) and the Normal Probe (1019944) and Photovolt Multiplier Assembly (1019971) to be better than ± 1% when subjected to continuous monitoring for a period of 4 hours in an ambient temperature which varied from 67°F through 77°F.

4.3.5 Utilizing the Reference Mirror (1001767) in conjunction with the Star–Horizon Simulator (1019977) and Auxiliary Precision Test Fixture (1019962), determine the parallelism of the lines of sight of the Light Beam Deflectors (1019909, 1019913) within 4 arc seconds over the temperature range of 67°F through 77°F.

4.3.6 Verify mechanical fit of the Star–Horizon Simulator Certification Fixture to the Auxiliary Precision Test Fixture (1019962) and the Star–Horizon Simulator Mounting Fixture (1019926) in the normal test configurations of 0° and 15° tilt angles.

4.3.7 Verify alignment of the Star–Horizon Simulator (1019977) and the Star–Horizon Simulator Certification Fixture over the temperature range of 67°F through 77°F on the Auxiliary Precision Test Fixture (1019962).

4.3.8 Verify that the Normal Probe (1019944) output is constant within ± 2% within the central 8 arc minutes of its field of view.

4.3.9 The 6 arc second star magnitude specified in paragraph 3.1.1 shall be measured at the calibration aperture of the SLOS–TLOS Light Beam Deflector (1019913). A reflectance factor shall be supplied for measurement at the star tracker aperture of the Light Beam Deflector (1019913) to account for variations in light due to the reflectivity of mirrors.

4.3.90 The horizon intensity specified in paragraph 3.1.2 shall be measured at the calibration aperture of the LOS-HS Light Beam Deflector (1019909). A reflectance factor shall be supplied for measurement at the horizon photometer aperture of the Light Beam Deflector (1019909).

4.4 Drawing Compliance – The assembly shall be examined for compliance to requirements of Apollo G&N Drawing 1019970. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearnce of markings.

5. PREPARATION FOR DELIVERY

5.1 General – Preparation for delivery shall be in accordance with Specification ND 1002214.

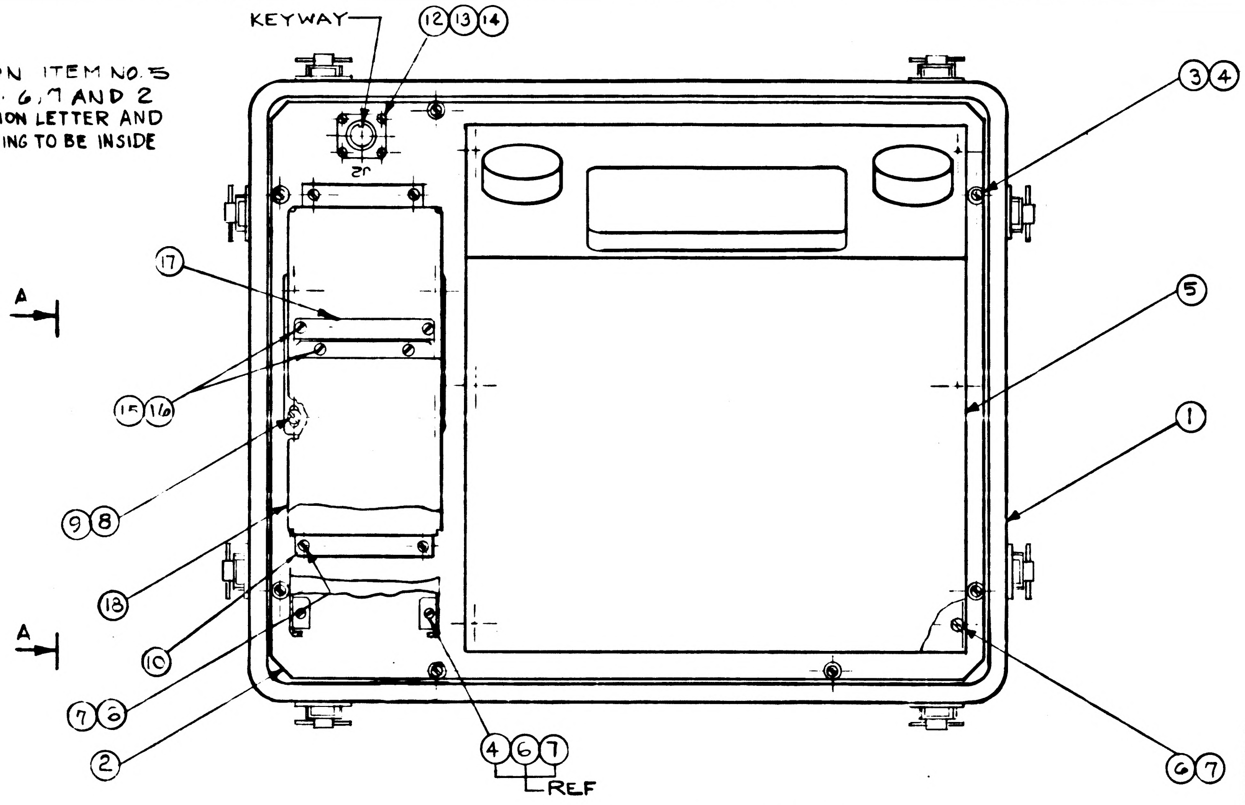
6. NOTES

6.1 The special tests designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

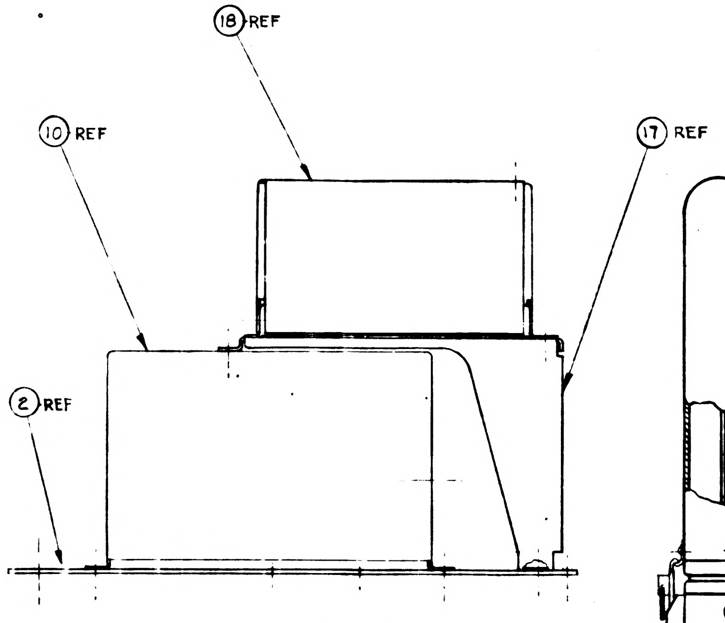
6.2 Materials Handling – The handling of tritium, a radioactive material, shall be in compliance with state and local regulations and licensing requirements.

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-REMOVE CHASSIS FROM CASE ON ITEM NO.5 BEFORE ASSEMBLY OF ITEM NO. 6,7 AND 2
3-IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURER'S SYM. PER ND 1002019 (MARKING TO BE INSIDE OF COVER)

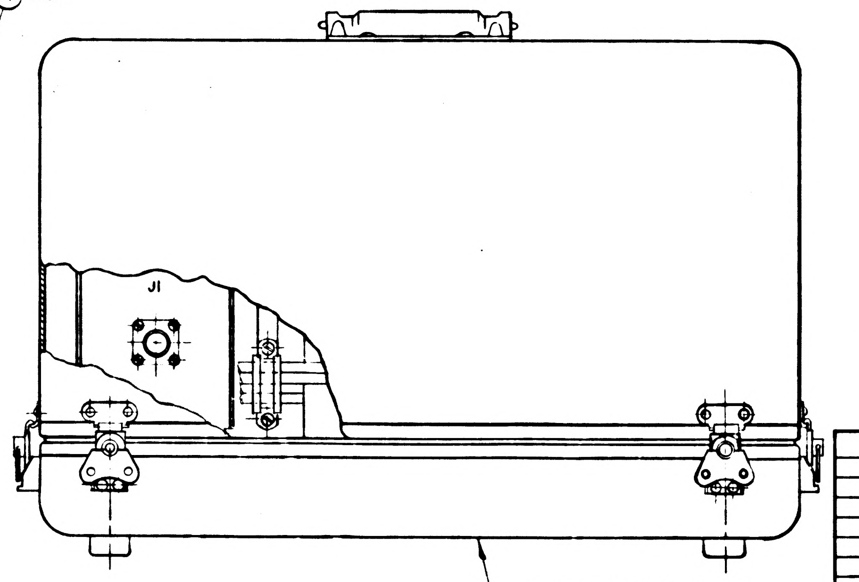
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROV
A_3		REVISED PER ECO 115205 TDRR 24650 DATE 12-8-65	HEB 12-13-65	



VIEW WITH COVER REMOVED



PARTIAL VIEW AA



IDENTIFICATION MARK SEE NOTE 3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1		1022837-011	02386910324		D.C. SIGNAL CHASSIS ASSY			
17	1		1022839-011	02386910327		SUPPORT BRACKET AND CLINCH NUT ASSY			
16	6		MS35337-79	74439050003		WASHER, LOCK			
15	6		MS35233-26	74455185026		SCREW, MACHINE PAN HD			
14	4		MS35233-13	74455185013		SCREW, MACHINE, PAN HD.			
13	4		MS35337-78	74439050002		WASHER. LOCK			
12	1		1001853	68013041501		CONNECTOR, RECEPTACLE. ELECTRICAL			
11	2		1001846-4			NUT, SELF LOCKING			
10	1		1022827-011	02386910394		COVER, TRANSFORMER ASSY			
9	4		1001846-8			NUT, SELF-LOCKING			
8	4		MS35233-62	74455185062		SCREW, MACHINE, PAN HD.			
7	12		MS35337-80	74439050004		WASHER, LOCK			
6	12		MS35233-41	74455185041		SCREW, MACHINE, PAN HD			
5	1		1022826-011	02386910395		PHOTOVOLT MULTIPLIER			
4	9		AN960-C8L	74468050001		WASHER, PLAIN FLAT			
3	7		MS35233-46	74455185046		SCREW, MACHINE, PAN HD			
2	1		1019555	03386911393		PLATE, COMPONENT MOUNTING			
(A1) 1	1		1001893	02386910393		CASE, CARRYING, PHOTOVOLT MULTIPLIER			
	-011	LIST OF PARTS AND MATERIALS							

1019970	1019970
NEXT ASSY	USED ON
APPLICATION	

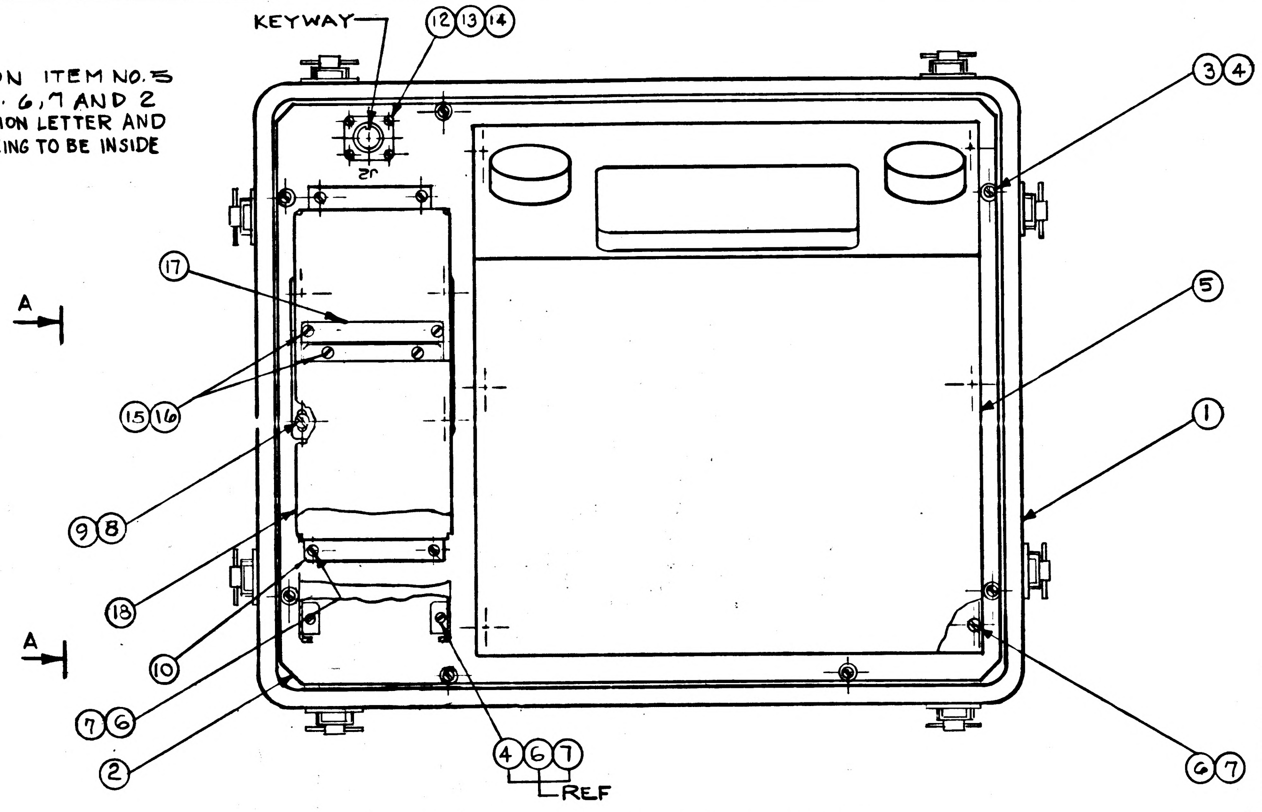
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT (A2) NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910053
DRAWN R. DE CARLO DATE 11-20-64
CHECKED E. J. ROHL 4-28-65
APPROVAL 4-30-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

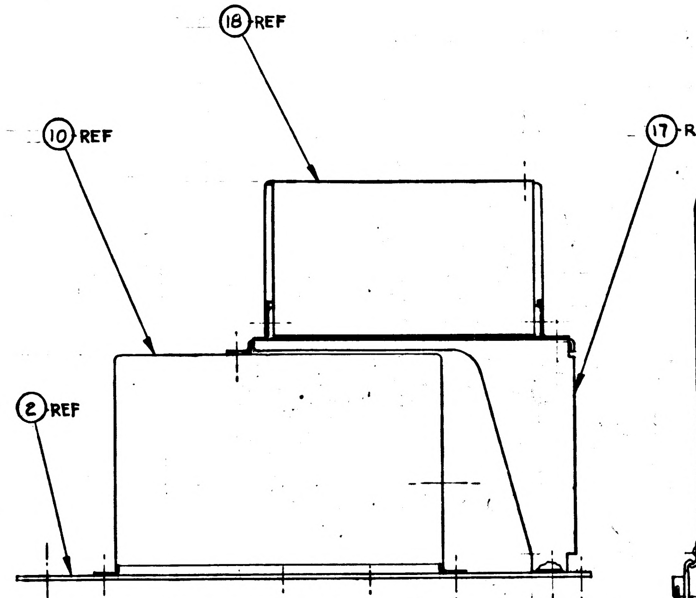
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
PHOTOVOLT MULTIPLIER ASSY
CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019971
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 1
(A3)

NOTES:
1- INTERPRET DWG PER MIL-D-70327
2- REMOVE CHASSIS FROM CASE ON ITEM NO. 5 BEFORE ASSEMBLY OF ITEM NO. 6, 7 AND 2
3- IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURER'S SYM. PER ND 1002019 (MARKING TO BE INSIDE OF COVER)

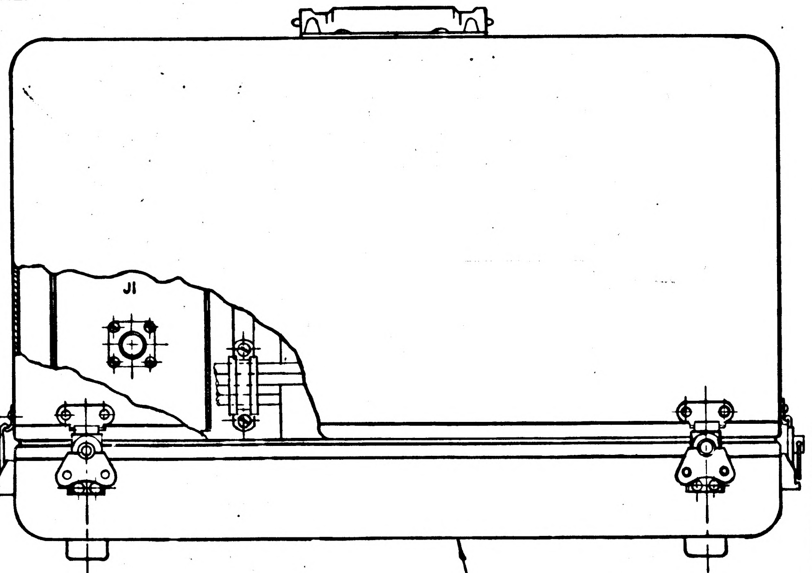
REVISIONS TDRR 1986c				
SYM	ZONE	DESCRIPTION	DATE	APPROV.



VIEW WITH COVER REMOVED



PARTIAL VIEW AA



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1		1022837-011	02386910324		D.C. SIGNAL CHASSIS ASSY			
17	1		1022839-011	02386910327		SUPPORT BRACKET AND CLINCH NUT ASSY			
16	6		MS35337-79	74439050003		WASHER, LOCK			
15	6		MS35233-26	74455185026		SCREW, MACHINE PAN HD			
14	4		MS35233-13	74455185013		SCREW, MACHINE, PAN HD.			
13	4		MS35337-78	74439050002		WASHER, LOCK			
12	1		1001853	68013041501		CONNECTOR, RECEPTACLE, ELECTRICAL			
11	2		1001846-4			NUT, SELF LOCKING			
10	1		1022827-011	02386910394		COVER, TRANSFORMER ASSY			
9	4		1001846-8			NUT, SELF-LOCKING			
8	4		MS35233-62	74455185062		SCREW, MACHINE, PAN HD.			
7	12		MS35337-80	74439050004		WASHER, LOCK			
6	12		MS35233-41	74455185041		SCREW, MACHINE, PAN HD			
5	1		1022826-011	02386910395		PHOTO VOLT MULTIPLIER			
4	9		AN960-C8L	74468050004		WASHER, PLAIN FLAT			
3	7		MS35233-46	74455185046		SCREW, MACHINE, PAN HD			
2	1		1019555	03386911393		PLATE, COMPONENT MOUNTING			
1	1		1001893-011	02386910393		CASE, CARRYING, PHOTOVOLT MULTIPLIER			
	-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
1019970	1019970

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910053
DRAWN R. DE CARLO DATE 11-20-64
CHECKED E. J. ROHL 4-28-65
APPROVAL 4-30-65
APPROVAL
NASA APPROVAL 4/4/65
6/3/65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PHOTOVOLT MULTIPLIER
ASSY

CODE IDENT NO. 89944
SIZE D
NASA NUMBER 1019971
SCALE 1:2
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-180

APOLLO G&N Specification
PS 1019977 REV. A
Original Issue Date: 21 MAY 65
Release Authority: TDRR 19256
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

STAR-HORIZON SIMULATOR

DRAWING NO. 1019977

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
6-11-65	A	20051	2,3,4,7,9,10	M. MURLEY	W. RHINE

This specification consists of page 1 to 10 inclusive.

APPROVALS	5/26/ NASA/MSC	5-20-65 20 May 65 MIT/IL	5-17-65 KIC

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator PART No. 1019977.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Effective issues.

2.1.2 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements for

DRAWINGS

APOLLO G&N

1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1019926	Star-Horizon Simulator Mounting Fixture
1019962	Aux. P. T. F. Stand

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3.1 Performance.

3.1.1 Star Simulation

3.1.1.1 The Simulator shall provide two stars, one a 6 ± 1 arc second star with a 6 ± 1 arc second major axis and a 4.2 ± 1 arc second minor axis; the other shall be a 30 arc second star maximum.

3.1.1.2 The 6 arc second star shall have an S-4 photoelectric magnitude which is variable by means of neutral density filters from -0.5 to +4.0 (minimum range) as referenced to a star of spectral class A0 (11, 200°K effective color temperature). The Simulator shall have provisions for calibration of the 6 arc second star magnitude within an absolute accuracy of ± 18% with photometer Dwg. 1019970.

3.1.1.3 The 30 arc second star shall be variable in magnitude.

3.1.1.4 The Simulator shall incorporate a provision for exclusive selection of either the 6 arc second star simulation or the 30 arc second star simulation.

3.1.1.5 The 6 arc second star shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970 and by the SLOS (visual) and the Star Tracker Photometer over the entire range of magnitudes specified above except as limited by the specifications for the OUA.

3.1.1.6 The 30 arc second star shall be capable of being sensed simultaneously by the LLOS (visual) and the Horizon Photometer.

3.1.1.7 The Simulator shall be capable of positioning each star within a full field of one degree. The field of star motion shall be centralized about the optical (mechanical) axis of the Simulator within ± 1 arc minute. The Simulator shall provide a micrometer readout for star position. The micrometer readout shall be to an accuracy of 1 arc second or better. The accuracy of the star position when viewed at the OUA shall be ± 3 arc seconds or better when utilizing the central 20 minutes of the field and ± 5 arc seconds or better when using the remainder of the 60 min field. A conversion factor from micrometer reading to arc seconds shall be supplied with the Simulator. A tabulation showing star position with respect to the optical (mechanical) axis of the Simulator vs dial readout shall be supplied.

3.1.2 Horizon Simulation

3.1.2.1 The Horizon size shall be a minimum of 30 arc minutes and shall be centered within 30 arc sec of the Simulator optical axis. The horizon shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970, by the SXT LLOS and by the Horizon Photometer of the OUA.

3.1.2.2 The Horizon intensity shall be variable. The ratio of horizon intensity variation shall be 6:1 or greater and shall encompass the linear range of the Horizon Photometer.

3.1.2.3 The Simulator horizon intensity shall be calibrated to an absolute accuracy of ± 20% utilizing photometer Dwg. 1019970.

3.1.2.4 The relative horizon intensity variation shall be capable of being calibrated as a function of neutral density filter position within 5% utilizing photometer Dwg. 1019970. A calibration chart of this function shall be provided.

3.1.3 Intensity Variation

3.1.3.1 It shall be possible to read the position of the neutral density counter-rotating filters within 1.0 degrees, and to an accuracy of 1.0 degrees or better.

3.1.4 Power Supplies

3.1.4.1 The power supply shall operate from 115V ±10%, 50-60 cps ± 5%. The dc output voltage of the power supply shall be regulated to 0.1% under normal load when the input voltage is varied by 10%. The peak to peak output ripple shall not exceed 3 millivolts.

3.1.5 Shrouds

3.1.5.1 The shrouds shall preclude extraneous light from entering the optical path between the following:

1. Autocollimator and mirror array assembly
2. Mirror array assembly and the calibration photometer
3. Mirror array assembly and the OUA

3.1.6 Folding Mirrors

3.1.6.1 Each mirror array assembly shall contain two precision mirrors. The plane parallelism of the reflecting surfaces of the two mirrors shall be within 4 arc seconds, and shall be calibrated (Known) to 1 arc second or better.

3.1.6.2 The mirror array assembly which is used with the Horizon Photometer shall have a narrow band pass filter in the Calibration Photometer light path. This filter shall have a center wavelength of 3500 A^{o} ± 25A^{o} and a bandwidth of 200 A^{o} ± 5%. The filter shall have polished, parallel surfaces, and shall have a transmission characteristic greater than 40% at 3500 A^{o}.

3.1.7 Mechanical Stability

3.1.7.1 The Simulator, when used with the Star-Horizon Simulator Mounting Fixture 1019926, or Aux. PTF Stand Dwg. 1019962, shall remain stable to meet the optical and photometric accuracy requirements as outlined herein for a minimum of 4 hours over a temperature varying between 67°F and 77°F.

3.1.8 **Lamps**

3.1.8.1 The lamps which provide the light for the Star and horizon sources shall not require operation at a voltage greater than their rated voltage except for Horizon alignment. The lamps shall have a rated life of 50 hours minimum at rated voltage.

3.1.9 **Certification**

3.1.9.1 Overall alignment checks required for certification immediately prior to and after tests shall be capable of being performed to the accuracy specified herein without removing the Simulator from its test mounts.

3.2 Product Configuration

3.2.1 Drawings - The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019977 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 **Test Conditions**

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° ± 10° C

(b) Relative Humidity: 90% max

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 **Tests**

4.2.1 Mount the Simulator collimator on V blocks. Illuminate the Simulator Star lamp. View the star image by means of an auxiliary autocollimator or theodolite.

4.2.2 Select the 6 arc second star. Move the position of the 6 arc second star by means of the micrometer dials until a minimum motion of star is observed when the Simulator collimator is rotated in its V blocks.

4.2.3 Note the reading of the x and y micrometer dials. This shall define the center of the 6 arc sec star field and the center position for the star in the collimator.

4.2.4 Observe that only the 6 arc second star is visible.

4.2.5 Observe that the size of the star is 6 ± 1 arc seconds and is clearly defined over the entire 1° field of view. Verify star positional accuracy for the positions given in Table 1.

MICROMETER OFFSET		CIRCULAR ERROR LIMITATIONS
x ARC MIN	y ARC MIN	ALLOWABLE MISALIGNMENT
+3	±3	
	±7	± 3 arc sec
-7	±3	-
	±7	± 3 arc sec
+12	±12	
	±20	±5 arc sec
-20	±12	
	±20	± 5 arc sec

Table 1. Star Positional Accuracy

4.2.6 Vary the illumination of the Simulator Star lamp 15% above and below its normal value. Observe that no deterioration of focus occurs, and that the star diameter is constant.

4.2.7 With the Star lamp illumination set at 15% above its normal illumination vary the neutral density filters. The star brightness shall vary smoothly and no deterioration of star focus shall occur. The star size shall remain constant. The star image position shall not shift.

4.2.8 Leave the Star Lamp illuminated at 100% of its normal value for a period of 4 hours in an ambient temperature which can vary from 67°F to 77°F. No deterioration of focus shall be observed. The star image shall not shift position.

4.2.9 Return the 6 arc star to the original center setting as determined by the viewing telescope. It shall be identical to the previous reading of the x and y micrometer dials within ± 3 arc seconds.

4.2.10 Select the 30 arc second star. Determine the center position of its field of view. Observe the star is a maximum of 30 arc seconds and is clearly defined over its entire field of view. Observe that the 30 arc second star is the only star visible.

4.2.11 Mount the Simulator on V blocks. Illuminate the Simulator Star lamp (normal illumination). Set the star (SLOS - Star Tracker) mirror array assembly in place. Select the 6 arc second star and monitor the light output of the mirror array assembly with photometer Dwg. 1019970. The light output shall smoothly vary from a -0.5 to a +4.0 S4 photoelectric magnitude as the neutral density filters are varied. The measurement shall be made to an absolute accuracy of ± 15%. Calibrate the star magnitude vs neutral density filter position.

4.2.12 Set the star illumination at 100% of normal. Observe the photometer meter reading. The meter reading shall not vary more than ± 2% as the star position is varied within the central 20 minutes of the field, during a 4 hour period when the Simulator is in an ambient temperature of 72 ± 5°F.

4.2.13 Replace the Star Tracker mirror array assembly with the "Horizon" mirror array assembly. Monitor the light output of the mirror array assembly. The light output of the 30 arc second star in the spectral range 3400-3600Å shall be a minimum of ____________. Remove the power from the Star lamp and apply normal power to the Horizon lamp. Vary the horizon neutral density filter position. The photometer readout shall smoothly vary from a minimum of   to six times that value. The light output shall be measured to an absolute accuracy of ± 20%. The time to vary the horizon intensity over the 6:1 range specified above shall be less than one minute. A calibration shall be made of horizon intensity vs neutral density filter setting.

4.2.14 View the Horizon Simulator with a theodolite. Determine the size of the horizon field of view. The field of view. The field shall be 30 arc min. minimum.

4.2.15 Place the calibration photometer Dwg. 1019970 on a rotary or translational device. Knowing its field of view, scan the Horizon Simulator across its field for a minimum of 30 arc minutes minus the field of the photometer. The photometric meter reading shall not vary more than 2% over the field of view. Verify Horizon Simulator centralization in a manner similar to star centralization previously described.

4.2.16 Use two symmetrical apertures designed to allow approximately 20% of the light from the Simulator collimator to be sensed. One mask should allow light from the center of the collimator lens only to be sensed. Another should allow light from the symmetrical extremes of the collimator lens to be sensed. Plots of the relative magnitudes of the 6 arc second star vs neutral density filter position for each of the masks shall be identical within ± 2%.

4.2.17 Utilizing the Simulator as an autocollimator (6 sec star illuminated, microscope attached) verify the mirrors in each mirror array assembly are parallel within 4 arc seconds. Determine exact angle to 1 arc sec.

4.2.18 Utilizing dc volt meters, oscilloscopes, variacs, and related test equipment verify power supply regulation to be better than 0.1%, and power supply ripple to be less than 3 millivolts at normal voltage used to illuminate lamps, when the input voltage is varied by ± 10%.

4.2.19 Replace the Star Simulator lamp. Retest for focus and calibration. The focus shall not have deteriorated. The light output shall be adjustable to fall within 5% of the data taken previously. Recalibrate.

4.3 Special Tests - The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Alignment of the Star–Horizon Simulator to the OUA and to the Star–Horizon Simulator Certification Fixture shall be verified to the tolerances specified and referenced herein when the above units are mounted on the Aux PTF Stand and undergo a temperature cycle.

4.3.2 The light outputs of the Star–Horizon Simulator shall be compatible with the visual and photometric requirements specified and referenced herein.

4.3.3 The Star–Horizon Simulator shall be capable of mounting on the Star–Horizon Simulator Holding Fixture and of being properly aligned on same.

4.3.4 There shall be no equipment interferences between the equipment used for Photometric tests, nor between these equipments and the equipments normally found at the various test sites.

4.3.5 The shrouds shall prevent extraneous light from entering the test configuration.

4.3.6 Repeat 4.2.8 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.3.7 Repeat 4.2.12 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.3.8 Verify results obtained in 4–2.17 over the entire field of view using an "autocollimator capable of viewing both lines of sight simultaneously.

4.4 Drawing Compliance – The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 1019977. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General – Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES.

6.1 The special tests designated in par. 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

APOLLO G&N Specification
PS 1019977 REV. B
Original Issue Date: 21 MAY 65
Release Authority: TDRR 19256
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

STAR-HORIZON SIMULATOR

DRAWING NO. 1019977

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
6-11-65	A	20051	2, 3, 4, 7, 9, 10, 11	M. MURLEY	W. RHINE
7-6-65	B	20903	3, 6, 7, 8, 9, 10	W. K.	A. M.

This specification consists of page 1 to 11 inclusive.

APPROVALS	5/26/6 NASA/MSC	W. Schmidt 5-20-65	20 May 65 MIT/IL	5-17-65 KIC

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator PART No. 1019977.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Effective issues.

2.1.2 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements for

DRAWINGS

APOLLO G&N

1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1019926	Star-Horizon Simulator Mounting Fixture
1019962	Aux. P. T. F. Stand

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.

b. This Specification.

c. Documents listed in this section.

3. REQUIREMENTS

3.1 Performance.

3.1.1 Star Simulation

3.1.1.1 The Simulator shall provide two stars, one a 6 ± 1 arc second star with a 6 ± 1 arc second major axis and a 4.2 ± 1 arc second minor axis; the other shall be a 30 arc second star maximum.

3.1.1.2 The 6 arc second star shall have an S-4 photoelectric magnitude which is variable by means of neutral density filters from -0. to +3.3 (minimum range) as referenced to a star of spectral class A0 (11, 200°K effective color temperature). The Simulator shall have provisions for calibration of the 6 arc second star magnitude within an absolute accuracy of ± 18% with photometer Dwg. 1019970.

3.1.1.3 The 30 arc second star shall be variable in magnitude.

3.1.1.4 The Simulator shall incorporate a provision for exclusive selection of either the 6 arc second star simulation or the 30 arc second star simulation.

3.1.1.5 The 6 arc second star shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970 and by the SLOS (visual) and the Star Tracker Photometer over the entire range of magnitudes specified above except as limited by the specifications for the OUA.

3.1.1.6 The 30 arc second star shall be capable of being sensed simultaneously by the LLOS (visual) and the Horizon Photometer.

3.1.1.7 The Simulator shall be capable of positioning each star within a full field of one degree. The field of star motion shall be centralized about the optical (mechanical) axis of the Simulator within ± 1 arc minute. The Simulator shall provide a micrometer readout for star position. The micrometer readout shall be to an accuracy of 1 arc second or better. The accuracy of the star position when viewed at the OUA shall be ± 3 arc seconds or better when utilizing the central 20 minutes of the field and ± 5 arc seconds or better when using the remainder of the 60 min field. A conversion factor from micrometer reading to arc seconds shall be supplied with the Simulator. A tabulation showing star position with respect to the optical (mechanical) axis of the Simulator vs dial readout shall be supplied.

3.1.2 Horizon Simulation

3.1.2.1 The Horizon size shall be a minimum of 30 arc minutes and shall be centered within 30 arc sec of the Simulator optical axis. The horizon shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970, by the SXT LLOS and by the Horizon Photometer of the OUA.

3.1.2.2 The Horizon intensity shall be variable. The ratio of horizon intensity variation shall be 6:1 or greater and shall encompass the linear range of the Horizon Photometer.

3.1.2.3 The Simulator horizon intensity shall be calibrated to an absolute accuracy of ± 20% utilizing photometer Dwg. 1019970.

3.1.2.4 The relative horizon intensity variation shall be capable of being calibrated as a function of neutral density filter position within 5% utilizing photometer Dwg. 1019970. A calibration chart of this function shall be provided.

3.1.3 Intensity Variation

3.1.3.1 It shall be possible to read the position of the neutral density counter-rotating filters within 1.0 degrees, and to an accuracy of 1.0 degrees or better.

3.1.4 Power Supplies

3.1.4.1 The power supply shall operate from 115V ±10%, 50-60 cps ± 5%. The dc output voltage of the power supply shall be regulated to 0.1% under normal load when the input voltage is varied by 10%. The peak to peak output ripple shall not exceed 3 millivolts.

3.1.5 Shrouds

3.1.5.1 The shrouds shall preclude extraneous light from entering the optical path between the following:

1. Autocollimator and mirror array assembly
2. Mirror array assembly and the calibration photometer
3. Mirror array assembly and the OUA

3.1.6 Folding Mirrors

3.1.6.1 Each mirror array assembly shall contain two precision mirrors. The plane parallelism of the reflecting surfaces of the two mirrors shall be within 4 arc seconds, and shall be calibrated (Known) to 1 arc second or better.

3.1.6.2 The mirror array assembly which is used with the Horizon Photometer shall have a narrow band pass filter in the Calibration Photometer light path. This filter shall have a center wavelength of 3500 A° ± 25A° and a bandwidth of 200 A° ± 5%. The filter shall have polished, parallel surfaces, and shall have a transmission characteristic greater than 40% at 3500 A°.

3.1.7 Mechanical Stability

3.1.7.1 The Simulator, when used with the Star-Horizon Simulator Mounting Fixture 1019926, or Aux. PTF Stand Dwg. 1019962, shall remain stable to meet the optical and photometric accuracy requirements as outlined herein for a minimum of 4 hours over the temperature varying between 67°F and 77°F.

3.1.8 Lamps

3.1.8.1 The lamps which provide the light for the Star and horizon sources shall not require operation at a voltage greater than their rated voltage except for Horizon alignment. The lamps shall have a rated life of 50 hours minimum at rated voltage.

3.1.9 Certification

3.1.9.1 Overall alignment checks required for certification immediately prior to and after tests shall be capable of being performed to the accuracy specified herein without removing the Simulator from its test mounts.

3.2 Product Configuration

3.2.1 Drawings - The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019977 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

Product Performance and Configuration Requirements/Quality Verification Cross Reference Index.

Paragraph Title	Performance Requirements	Test Verification
Star Simulation	3.1.1.1	4.2.5, 4.2.10
	3.1.1.2	4.2.11
	3.1.1.3	4.2.13
	3.1.1.4	4.2.2, 4.2.3, 4.2.4, 4.2.10
	3.1.1.5	4.2.11
	3.1.1.6	4.2.13
	3.1.1.7	4.2.2, 4.2.3, 4.2.5, 4.2.9
Horizon Simulation	3.1.2.1	4.2.14
	3.1.2.1	4.2.13
	3.1.2.3	4.2.13
	3.1.2.4	4.2.13

Paragraph Title	Performance Requirements	Test Verification
Intensity Simulation	3.1.3.1	4.2.11, 4.2.13
Power Supplies	3.1.4.1	4.2.18
Shrouds	3.1.5.1	4.3.5
Folding Mirrors	3.1.6.1, 3.1.6.2	4.2.17, 4.2.13
Mechanical Stability	3.1.7.1	4.2.8, 4.3.3

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° ± 10°C

(b) Relative Humidity: 90% max.

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 Tests

4.2.1 Mount the simulator collimator on Sliding Platform P/N 1019919 or equivalent. Illuminate the Simulator Star lamp. View the star image by means of an auxiliary autocollimator or theodolite.

4.2.2 Select the 6 arc second star. Move the position of the 6 arc second star by means of the micrometer dials until a minimum motion of star is observed when the Simulator collimator is rotated in its V blocks.

4.2.3 Note the reading of the x and y micrometer dials. This shall define the center of the 6 arc sec star field and the center position for the star in the collimator.

4.2.4 Observe that only the 6 arc second star is visible.

4.2.5 Observe that the size of the star is 6 ± 1 arc seconds and is clearly defined over the entire 1° field of view. Verify star positional accuracy for the positions given in Table 1.

MICROMETER OFFSET		CIRCULAR ERROR LIMITATIONS
x ARC MIN	y ARC MIN	ALLOWABLE MISALIGNMENT
+3 +3	±3	± 3 arc sec
	±7	
-7	±3	-
	±7	± 3 arc sec
+12	±12	
	±20	± 5 arc sec
-20	±12	
	±20	± 5 arc sec
-0	0	±3 arc sec
-30	0	± 5 arc sec

Table 1. Star Positional Accuracy

4.2.6 Vary the illumination of the Simulator Star lamp 15% above and below its normal value. Observe that no deterioration of focus occurs, and that the star diameter is constant.

4.2.7 With the Star lamp illumination set at 15% above its normal illumination vary the neutral density filters. The star brightness shall vary smoothly and no deterioration of star focus shall occur. The star size shall remain constant. The star image position shall not shift.

4.2.8 Leave the Star Lamp illuminated at 100% of its normal value for a period of 4 hours in an ambient temperature which can vary from 67°F to 77°F. No deterioration of focus shall be observed. The star image shall not shift position.

4.2.9 Return the 6 arc star to the original center setting as determined by the viewing telescope. It shall be identical to the previous reading of the x and y micrometer dials within ± 3 arc seconds.

4.2.10 Select the 30 arc second star. Determine the center position of its field of view. Observe the star is a maximum of 30 arc seconds and is clearly defined over its entire field of view. Observe that the 30 arc second star is the only star visible.

4.2.11 Mount Simulator on sliding platform 1019919 or equivalent. Illuminate the Simulator Star lamp (normal illumination). Set the star (SLOS - Star Tracker) mirror array assembly in place. Select the 6 arc second star and monitor the light output of the mirror array assembly with photometer Dwg. 1019970. The light output shall smoothly vary from a 0 to a +3.3 S4 photoelectric magnitude as the neutral density filters are varied. The measurement shall be made to an absolute accuracy of ± 15%. Calibrate the star magnitude vs neutral density filter position.

4.2.12 Set the star illumination at 100% of normal. Observe the photometer meter reading. The meter reading shall not vary more than ± 2% as the star position is varied within the central 20 minutes of the field, during a 4 hour period when the Simulator is in an ambient temperature of 72 ± 5°F.

4.2.13 Replace the Star Tracker mirror array assembly with the "Horizon" mirror array assembly. Monitor the light output of the mirror array assembly. The light output of the 30 arc second star in the spectral range 3400-3600A shall be a minimum of   . Remove the power from the Star lamp and apply normal power to the Horizon lamp. Vary the horizon neutral density filter position. The photometer readout shall smoothly vary from a minimum of   to six times that value. The light output shall be measured to an absolute accuracy of ± 20%. The time to vary the horizon intensity over the 6:1 range specified above shall be less than one minute. A calibration shall be made of horizon intensity vs neutral density filter setting.

4.2.14 View the Horizon Simulator with a theodolite. Determine the size of the horizon field of view. The field shall be 30 arc min. minimum.

4.2.15 Place the calibration photometer in a position to view the Simulated Horizon. Determine the photometric center of the horizon field. It shall be within ± 30 arc seconds of the Optical Axis. Record H and V coordinates. Utilizing the Horizon translation carriage, scan the' Horizon for an interval of 4 arc min. to each side of the photometric center. The photometer reading shall not vary more than 2% of maximum over the total scan.

4.2.16 Use two symmetrical apertures designed to allow approximately 20% of the light from the Simulator collimator to be sensed. One mask should allow light from the center of the collimator lens only to be sensed. Another should allow light from the symmetrical extremes of the collimator lens to be sensed. Plots of the relative magnitudes of the 6 arc second star vs neutral density filter position for each of- the masks shall be identical within ± 2 %.

4.2.17 Utilizing the Simulator as an autocollimator (6 sec star illuminated, microscope attached) verify the mirrors in each mirror array assembly are parallel within 4 arc seconds. Determine exact angle to 1 arc sec.

4.2.18 Utilizing dc volt meters, oscilloscopes, variacs, and related test equipment verify power supply regulation to be better than 0.1% and power supply ripple to be less than 3 millivolts at normal voltage used to illuminate lamps, when the input voltage is varied by ± 10%.

4.2.19 Replace the Star Simulator lamp. Retest for focus and calibration. The focus shall not have deteriorated. The light output shall be adjustable to fall within 5% of the data taken previously. Recalibrate.

4.3 Special Tests - The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Alignment of the Star-Horizon Simulator to the OUA and to the Star-Horizon Simulator Certification Fixture shall be verified to the tolerances specified and referenced herein when the above units are mounted on the Aux PTF Stand and undergo a temperature cycle.

4.3.2 The light outputs of the Star-Horizon Simulator shall be compatible with the visual and photometric requirements specified and referenced herein.

4.3.3 The Star-Horizon Simulator shall be capable of mounting on the Star-Horizon Simulator Holding Fixture and of being properly aligned on same.

4.3.4 There shall be no equipment interferences between the equipment used for Photometric tests, nor between these equipments and the equipments normally found at the various test sites.

4.3.5 The shrouds shall prevent extraneous light from entering the test configuration.

4.3.6 Repeat 4.2.8 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.3.7 Repeat 4.2.12 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.3.8 Verify results obtained in 4-2.17 over the entire field of view using an "autocollimator capable of viewing both lines of sight simultaneously.

4.4 Drawing Compliance - The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 1019977. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General - Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES.

6.1 The special tests designated in par. 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

APOLLO G&N Specification
PS 1019977 REV. C
Original Issue Date: 21 MAY 65
Release Authority: TDRR 19256
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

STAR-HORIZON SIMULATOR

DRAWING NO. 1019977

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
6-11-65	A	20051	2, 3, 4, 7, 9, 10, 11	M. MURLEY	W. RHINE
M 7-6-65	B	20903	3, 6, 7, 8, 9, 10	W. K.	A. M.
10-6-65	C	23034	COMPLETELY REVISED (13 PAGES)	W. K.	A. M.

This specification consists of page 1 to 13 inclusive.

APPROVALS	NASA/MSC	W. Schmidt 5-20-65 / 20 May 65 MIT/IL	5-17-65 KIC

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator No. 1019977-011.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Effective Issues.

2.1.2 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G AND N

ND 1002214	Preservation, Packaging, Container, Marking and Packaging, General Requirements for
ND 1002023	Serialization, General Specification For

DRAWINGS

APOLLO G AND N

1019977	Star-Horizon Simulator
1019909	Deflector, Light Beam LLOS and HS
1019970	Star-Horizon Simulator Certification Fixture
1019913	Deflector, Light Beam SLOS and TLOS
1019962	Auxiliary Precision Test Fixture

2011000	Optical Unit
1016949	Functional Tester
1019919	Sliding Platform Assembly
1022908	Mirror Bridge Assembly
1022957	Filter Assembly
1022927	Cable Assembly

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of procedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract

b. This Specification

c. Documents listed in this section

3. REQUIREMENTS

3.1 Performance

3.1.1 Focusing and General Alignment

3.1.1.1 The Simulator shall be focused at 5461 Å ± 150 Å.

3.1.2 Star Simulation

3.1.2.1 The nominal 6 sec star shall not exceed 8 arc seconds along any axis. The nominal 30 sec star shall not exceed 35 arc seconds along any axis. The 6 arc sec star and the 30 arc second star shall be separately selectable.

3.1.2.2 H_6 and V_6 micropositioner readings shall be obtained which will center the 6 sec star within 1 arc minute of the Optical (mechanical) Axis of the Simulator.

3.1.2.3 H_{30} and V_{30} micropositioner readings shall be obtained which will center the 30 sec star within 1 arc minute of the Optical (mechanical) Axis of the Simulator.

3.1.2.4 A six (6) decimal place conversion factor shall be determined to convert H and V micropositioner reading into arc minutes, i.e. 1 arc MIN = 0.00xxxx INCHES.

3.1.2.5 The 30 sec star shall have a 1 degree field of view (minimum) centered about the position determined in para. 3.1.2.3. The 6 sec star shall have a 1 degree field of view (minimum) centered about the position determined in para. 3.1.2.2.

3.1.2.6 The 6 sec star angular positioning accuracy with respect to the center position determined in para. 3.1.2.2 and utilizing the scale factor determined in para. 3.1.2.4 shall be 3 arc seconds within the central 20 arc minute field and 5 arc seconds within the central 1 arc degree field.

3.1.2.7 The mirrored surfaces of Deflection Mirror Assembly 1019913-011 shall be parallel within 6 arc seconds (rss) for a period of four hours when subjected to a temperature rise of 10^{o}F at an approximate rate of 2.5^{o}F per hour from 67^{o}F ± 5^{o}. The parallelism as measured at the base temperature point of the 10^{o} rise, at the midpoint of the 10^{o} rise and at the peak of the 10^{o} rise shall have a maximum spread of 2 arc seconds along any measurement axis and along the rss of coordinate measurements.

3.1.2.8 The Star Tracker LOS mirror in Deflection Mirror Assembly 1019913-011 shall have an S-4 (3000-7000 Å) reflectance in excess of 70%. The mirror reflectance shall be known to ± 5%.

3.1.2.9 The 6 sec star shall have an S-4 photoelectric star magnitude which shall encompass the range from - 4.0 to + 4.0 star magnitudes when:

a. The star magnitudes are referenced to an AO star (11, 200^{o}K effective color temperature) by means of the Langley method.

b. The star magnitude is effectively calibrated at the exit aperture of the Star Tracker LOS Mirror. (This means mask P/N 1022147 must be used in star calibration and the mirror reflectivity factored into the calibration.)

3.1.2.10 The 30 sec star magnitude shall be a minimum of 7.5 (10^{-7}) watts/cm^2/steradian in the spectral region 3200-3900 Å * when tested in accordance with section 4.

*The region defined by the 1% transmission characteristics of the narrowband filter used with the calibration photometer.

3.1.3 Horizon Simulation

3.1.3.1 The horizon shall be 30 arc minutes minimum.

3.1.3.2 The horizon center shall be given as H_H and V_H micropositioner readings. The horizon center shall be defined as the average of the H and V coordinates for the 98% intensity points obtained by scans through the peak intensity.

3.1.3.3 The horizon intensity shall be uniform within 2% over the central 8 arc minute region and within ± 25% over the central 30 arc minute region.

3.1.3.4 The mirrored surfaces of Deflection Mirror Assembly 1019909-011 shall be parallel within 6 arc seconds (rss) for a period of four hours when subjected to a temperature rise of 10°F at an approximate rate of 2.5°F per hour from 67°F ± 5°. The parallelism as measured at the base temperature point of the 10° rise, at the midpoint of the 10° rise and at the peak of the 10° rise shall have a maximum spread of 2 arc seconds along any measurement axis and along the rss of coordinate measurements.

3.1.3.5 The Horizon Photometer LOS mirror in Deflection Mirror Assembly 1019909-011 shall have a reflectance over the region 3400 Å-3600 Å in excess of 60%. The mirror reflectance shall be known to ± 5%.

3.1.3.6 The Horizon intensity shall be a minimum of 9.5 (10^{-4}) watts/cm^2/steradian in the spectral region 3200-3900 Å * when effectively measured at the exit aperture of the Horizon Photometer LOS mirror. (The Horizon intensity calibration shall include the following calibration factors: mirror reflectivity, and horizon nonuniformity. The Horizon intensity shall be variable by means of neutral density filters from 9.5 (10^{-4}) watts/cm^2/steradian to 2.4 (10^{-4}) watts/cm^2/steradian (minimum range).

*The region defined by the 1% transmission characteristics of the narrowband filter used with the calibration photometer.

3.1.4 Power Supply

3.1.4.1 The power supply shall have the following characteristics:

Input 115V ± 10%, 50-60 cycles per second
DC Output 0-10 volts, 0-10 AMPS
DC Output regulation ** 0.1%
DC Output ripple *** 0.025% of dc output

**under normal load (8V, 1 Ω load) when the input voltage is varied by ± 10%.

***tested at extreme end of 10 foot cable (P/N 1022927-011) when dc output is operated at 4 Vdc and at 8V dc.

3.1.5 Special Requirements. These requirements shall be verified only on the first article as defined in para. 6.1.

3.1.5.1 The Simulator when used with the Auxiliary PTF P/N 1019[illegible]2-011. The Star-Horizon Simulator Certification Fixture P/N [illegible]9970-011, and Functional Tester P/N 1016949-011 shall be capable of testing the following OUA P/N 2011000 characteristics.

a. Parallelism of LLOS-HPLOS to an accuracy of 10 arc seconds or better.
b. Parallelism of SLOS-STLOS to an accuracy of 10 arc seconds or better.
c. Verifying the Horizon Photometer High Voltage Power Supply Setting to an accuracy of ± 20%.

NOTE: The tolerances specified in para. 3.1.5.1 can not be tested directly and must be deduced from the data and procedures.

3.1.5.2 Any LOS generated by the Star-Horizon Simulator (from the Deflection Mirror Assembly) when the Simulator is mounted on the Auxiliary Precision Test Fixture P/N 1019962-011 shall remain positioned with respect to a fixed OUA or Yoke Position Fixture LOS within a spread of 15 arc seconds for a period of 4 hours subjected to a temperature rise of 10°F at an average rate of 2.5°F per hour from + 67°F ± 5°.

3.2 Product Configuration

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G and N Drawing 1019977 and all drawings and engineering data referenced thereon.

3.2.2 Serialization. Each assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

Product Performance and Configuration Requirements/Quality Verification Cross Reference Index.

Performance Requirements	Paragraph Title	Test Verification
3.1.1.1	Focus	4.2.1.1
3.1.2.1	Star Size	4.2.2.1
3.1.2.2	6 Sec Star Center	4.2.2.2
3.1.2.3	30 Sec Star Center	4.2.2.3
3.1.2.4	Conversion Factor	4.2.2.4
3.1.2.5	Field of View	4.2.2.5
3.1.2.6	Positioning Accuracy	4.2.2.6
3.1.2.7	SLOS-STLOS Parallelism	4.2.2.7
3.1.2.8	STLOS - Reflectivity	4.2.2.8
3.1.2.9	6 Sec Star Magnitudes	4.2.2.9
3.1.2.10	30 Second Star Intensity	4.2.2.10
3.1.3.1	Horizon Size	4.2.3.1

Performance Requirements	Paragraph Title	Test Verification
3.1.3.2	Horizon Center	4.2.3.2
3.1.3.3	Horizon Uniformity	4.2.3.3
3.1.3.4	LLOS-HSLOS Parallelism	4.2.3.4
3.1.3.5	HSLOS-Reflectivity	4.2.3.5
3.1.3.6	Horizon Intensity	4.2.3.6
3.1.4.1	Power Supply	4.2.4.1
3.1.5.1	Special Requirements	4.3.2
3.1.5.2	Special Requirements	4.3.3
3.2.1	Configuration	4.4

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 72°F ± 10°F

b. Relative Humidity: 90% maximum

c. Barometric Pressure: 23 to 32 inches of Hg.

4.2 Tests

4.2.1 Focus

4.2.1.1 Present pre-acceptance certification data that infinity focus of the Simulator-Collimator has been set utilizing a DKM-3 Theodolite, and narrowband filters centered at 5461 Å.

4.2.2 Star Simulation

4.2.2.1 Measure the diameter of the 6 sec star and 30 sec star utilizing a DKM-3 Theodolite and selective green filter.

4.2.2.2 View the 6 sec star by means of a DKM-3 Theodolite and selective green filter while rotating the simulator collimator in V-blocks. Determine the H and V positions required to center the 6 sec star.

4.2.2.3 View the 30 sec star by means of a DKM-3 Theodolite and selective green filter while rotating the Simulator Collimator in V-blocks. Determine the H and V positions required to center the 30 sec star.

4.2.2.4 View the 6 sec star with a DKM-3 Theodolite and selective green filter. Align the star motion axes to the DKM-3 reticle axes. Determine the scale factor from H and V micropositioner readings to arc minutes utilizing the azimuth and elevation readings taken with the DKM-3 Theodolite and the corresponding star positions.

4.2.2.5 Utilizing a DKM-3 Theodolite and selective green filter, verify that the 6 sec star and 30 sec star are clearly defined over the field of view.

4.2.2.6 Utilizing a DKM-3 Theodolite as in paragraph 4.2.2.4 and selective green filter verify 6 sec star positioning accuracy at the following positions (referenced to the H and V star center position).

H Arc Min	V Arc Min
+3	±3
	±7
-7	±3
	±7
+12	±12
	±20

H Arc Min	V Arc Min
- 20	± 12
	± 20
- 30	0

4.2.2.7 Mount the Deflection Mirror Assembly P/N 1019913-011, the Mirror Bridge Assembly P/N 1022908-011 and the Star-Horizon Simulator Collimator P/N 1019977-011 on Sliding Platform Assembly P/N 1019919-011. Utilizing the Simulator as an autocollimator determine the parallelism between the SLOS mirror and the Star Tracker LOS mirror. Subject the configuration to a temperature rise of + 10°F from the base point of 67°F ± 5°F. Determine parallelism at base point, midpoint of rise and at 10° rise point.

4.2.2.8 Determine the S-4 mirror reflectivity of the Star Tracker LOS mirror by A or B.

A. Certification

Integrated data taken of reflectivity (at 45°) at selected wavelengths from 3000-7000 Å.

B. Measurement

Utilizing a SHS Certification Fixture P/N 1019970-011, and filter assembly P/N 1022957-011, with a 5/8" clear aperture (filter removed) measure the output of the Simulator with and without the Deflector Mirror Assembly and determine the mirror reflectivity as the ratio of the two readings. Reflectivity 1.

4.2.2.9 Utilizing a calibration curve for the SHS Certification Fixture 1019970-011 (Photometric Units vs Star Magnitude) determine number of photometric units required to obtain specified star magnitudes. Set SHSCF to read output of Simulator 6 sec star and verify star magnitude output. (Mirror reflection factor and tritium decay values in calibration.)

4.2.2.10 Measure the output of the centered 30 sec identically to para. 4.2.3.6 except delete Nonuniformity from calibration.

4.2.3 Horizon Simulation

4.2.3.1 Measure the diameter of the simulated horizon using a DKM-3 Theodolite with the green filter.

4.2.3.2 Mount the Star-Horizon Simulator Collimator and SHS Certification Fixture Normal Probe on Sliding Platform Assembly P/N 1019919-011. Determine the H and V micropositioner readings for the center of the horizon by plotting photometer output versus H and V coordinates (2 plots).

4.2.3.3 Verify horizon uniformity from the graphs plotted in 4.2.3.2.

4.2.3.4 Mount the Deflection Mirror Assembly P/N 1019909-011, the Mirror Bridge Assembly P/N 1022908-011 and the Star-Horizon Simulator Collimator P/N 1019977-011 on Sliding Platform Assembly P/N 1019919-011. Utilizing the simulator as an autocollimator determine the parallelism between the HSLOS Mirror and the LLOS Mirror. Subject configuration to a temperature rise of + 10°F from a base point of 67°F ± 5°F. Determine parallelism at base point, midpoint of rise and at 10° rise point.

4.2.3.5 Determine the mirror reflectivity of the HSLOS Mirror in the region 3400-3600 Å by method A or B.

A. Certification

Integrated data taken of reflectivity (at 45°) at selected wavelengths throughout the range of 3400-3600 Å.

B. Measurement

Utilizing a SHS Certification Fixture P/N 1019970-011 and filter assembly P/N 1022957 measure the output of the Simulator with and without the deflector mirror assembly P/N 1019909-011 and determine the mirror reflectivity as the ratio of the two readings. Reflectivity shall be less than 1.

4.2.3.6 Mount the Simulator Collimator and SHSCF Normal Probe on Sliding Platform Assembly. Set power supply to obtain maximum horizon intensity as required in para. 3.1.3.6. Set neutral density filter at maximum transmission using a certified SHSCF (set the SHSCF sensitivity to value at which SHSCF is calibrated in Photometric Units/(watts/cm^2/steradian). This number shall include tritium decay factors, mirror reflectivity, horizon nonuniformity and filter factors. The neutral density filters shall be varied to obtain the minimum range of horizon intensity as required in para. 3.1.3.6.

4.2.4 Power Supply

4.2.4.1 Utilizing dc voltmeters, ac-vtvm, variac and related test equipment, e.g., load resistors, test the power supply for output voltage, regulation and ripple.

4.3 Special Tests. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off to determine compatibility with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Perform OUA P/N 2011000 Tracker and Horizon Sensor Tests. Verify GSE measurement tolerances.

4.3.2 Stability. The Star-Horizon Simulator P/N 1019977 shall maintain a line of sight when mounted on the Auxiliary Precision Test Fixture P/N 1019962-011 as specified in para. 3.1.5.2.

4.4 Drawing Compliance and Mechanical and Visual Inspection. The assembly shall be visually examined for compliance with Apollo G and N drawing 1019977, and all drawings and specifications referenced thereon. The assemblies and subassemblies shall be visually inspected as a minimum for the following.

1. Size, dimension, tolerance, serialization, appearance and markings.
2. Adequacy of materials, parts, and subassemblies; compliance with specific ratings and conformance to applicable specifications.

3. Finish, coatings, light leaks, markings, and nameplates, as applicable.

4. Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.

5. Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

5.1 General. Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES

6.1 The special tests required in paragraph 3.1.5 and designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

APOLLO G&N Specification
PS 1019977 REV. D
Original Issue Date: 21 MAY 65
Release Authority: TDRR 19256
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

STAR-HORIZON SIMULATOR

DRAWING NO. 1019977

Record of Revisions

	Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
					MIT	NASA
M	6-11-65	A	20051	2, 3, 4, 7, 9, 10, 11	M. MURLEY	W. RHINE
M	7-6-65	B	20903	3, 6, 7, 8, 9, 10	W. K.	A. M.
M	10-6-65	C	23054	COMPLETELY REVISED 12 & 13 ADDED	W. K.	A. M.
	1/28/66	D	25734	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	M W	W. M

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	W. Schmidt 5-20-65 MIT/IL	5-17-65 KIC

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator No. 1019977-011.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Effective Issues.

2.1.2 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G AND N

ND 1002214	Preservation, Packaging, Container, Marking and Packaging, General Requirements for
ND 1002023	Serialization, General Specification For

DRAWINGS

APOLLO G AND N

1019977	Star-Horizon Simulator
1019909	Deflector, Light Beam LLOS and HS
1019970	Star-Horizon Simulator Certification Fixture
1019913	Deflector, Light Beam SLOS and TLOS
1019962	Auxiliary Precision Test Fixture

2011000	Optical Unit
1016949	Functional Tester
1019919	Sliding Platform Assembly
1022908	Mirror Bridge Assembly
1022957	Filter Assembly
1022927	Cable Assembly

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of procedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract

b. This Specification

c. Documents listed in this section

3. REQUIREMENTS

3.1 Performance

3.1.1 Focusing and General Alignment

3.1.1.1 The Simulator shall be focused at 5461 Å ± 150 Å.

3.1.2 Star Simulation

3.1.2.1 The nominal 6 sec star shall not exceed 8 arc seconds along any axis. The nominal 30 sec star shall not exceed 35 arc seconds along any axis. The 6 arc sec star and the 30 arc second star shall be separately selectable.

3.1.2.2 H_6 and V_6 micropositioner readings shall be obtained which will center the 6 sec. star within 1 arc minute of the Optical (mechanical) Axis of the Simulator.

3.1.2.3 H_{30} and V_{30} micropositioner readings shall be obtained which will center the 30 sec. star within 1 arc minute of the Optical (mechanical) Axis of the Simulator.

3.1.2.4 A six (6) decimal place conversion factor shall be determined to convert H and V micropositioner reading into arc minutes, i. e., 1 arc MIN = 0.00xxxx INCHES.

3.1.2.5 The 30 sec. star shall have a 1 degree field of view (minimum) centered about the position determined in para. 3.1.2.3. The 6 sec. star shall have a 1 degree field of view (minimum) centered about the position determined in para. 3.1.2.2.

3.1.2.6 The 6 sec. star angular positioning accuracy with respect to the center position determined in para. 3.1.2.2 and utilizing the scale factor determined in para. 3.1.2.4 shall be 3 arc seconds within the central 20 arc minute field and 5 arc seconds within the central 1 arc degree field.

3.1.2.7 The mirrored surfaces of Deflection Mirror Assembly 1019913-011 shall be parallel within 6 arc seconds (rss) for a period of four hours when subjected to a temperature rise of $10^{\circ}F$ at an approximate rate of $2.5^{\circ}F$ per hour from $67^{\circ}F \pm 5^{\circ}$. The parallelism as measured at the base temperature point of the 10° rise, at the midpoint of the 10° rise and at the peak of the 10° rise shall have a maximum spread of 2 arc seconds along any measurements axis and along the rss of coordinate measurements.

3.1.2.8 The Star Tracker LOS mirror in Deflection Mirror Assembly 10119913-011 shall have an S-4 (3000-7000 Å) reflectance in excess of 65%. The mirror reflectance shall be known to ± 5%.

3.1.2.9 The 6 sec. star shall have an S-4 photoelectric star magnitude which shall encompass the range from -4.0 to +4.0 star magnitude when:

a. The star magnitudes are referenced to an AO star ($11,200^{\circ}K$ effective color temperature) by means of the Langley method.

b. The star magnitude is effectively calibrated at the exit aperture of the Star Tracker LOS Mirror. (This means mask P/N 1022147 must be used in star calibration and the mirror reflectivity factored into the calibration.)

3.1.2.10 The 30 arc sec. star output shall be a minimum of 7.5 (10^{-7}) watts/cm^2/steradian in the spectral region 3200-3900Å*when tested in accordance with section 4. The physical units assigned to the 30 arc sec. star output are used only as a test procedure reference and are not to be interpreted as an absolute energy level.

*The region defined by the 1% transmission characteristics of the filter assembly 1022957 used with the Star-Horizon Simulator Certification Fixture 1019970.

3.1.3 Horizon Simulation

3.1.3.1 The horizon shall be 30 arc minutes minimum.

3.1.3.2 The horizon center shall be given as H_H and V_H micropositioner readings. The horizon center shall be defined as the average of the H and V coordinates for the 98% intensity points obtained by scans through the peak intensity.

3.1.3.3 The horizon intensity shall be uniform within 2% over the central 8 arc minute region and within ± 25% over the central 20 arc minute region.

3.1.3.4 The mirrored surfaces of Deflection Mirro Assembly 1019909-011 shall be parallel within 6 arc seconds (rss) for a period of four hours when subjected to a temperature rise of 10°F at an approximate rate of 2.5°F per hour from 67°F ± 5°. The parallelism as measured at the base temperature point of the 10° rise, at the midpoint of the 10° rise and at the peak of the 10° rise shall have a maximum spread of 2 arc seconds along any measurement axis and along the rss of coordinate measurements.

3.1.3.5 The Horizon Photometer LOS Mirror in the Deflection Mirror Assembly 1019909-011 shall have a reflectance in the spectral region 3200-3900 A *in excess of 85%. The mirror reflectance shall be known to ± 5%.

*The region defined by the 1% transmission characteristics of the filter assembly 1022957 used with the SHS Certification Fixture 1019970.

3.1.3.6 The horizon intensity measured at the exit aperture of the HLOS deflection mirror shall be a minimum of 4.5 (10^{-4}) watts/cm^2/steradian. The horizon intensity calibration shall include the following calibration factor: horizon nonuniformity. The horizon intensity shall be variable by means of neutral density filters from 4.5 (10^{-4}) watts/cm^2/steradian to 1.12 (10^{-4}) watts/cm^2/steradian. The spectral intensity distribution shall be limited by the filter (P/N 1022957) 1% (one percent) transmission points (approximately encompassed by the wavelength interval 3200 Å - 3900 Å). The horizon intensity expressed in watts/cm^2/steradian divided by the theoretical effective bandwidth of the filter 1022957, i.e. 200 Å, shall be the energy in watts/cm^2/steradian/Å at the theoretical center frequency, i.e. 3500 Å, of the filter (1022957). Therefore, the horizon intensity at 3500 Å shall be a minimum of 2.25 (10^{-6}) watts/cm^2/steradian/Å and shall be variable from 2.25 (10^{-6}) watts/cm^2/steradian/Å to 5.6 (10^{-7}) watts/cm^2/steradian/Å.

3.1.4 Power Supply

3.1.4.1 The power supply shall have the following characteristics:

Input 115V ± 10%, 50-60 cycles per second
DC Output 0-10 volts, 0-10 AMPS
DC Output regulation ** 0.1%
DC Output ripple *** 0.025% of dc output

**under normal load (8V, 1 load) when the input voltage is varied by ± 10%.

***tested at extreme end of 10 foot cable (P/N 1022927-011)when dc output is operated at 4 Vdc and at 8Vdc.

3.1.5 Special Requirements. These requirements shall be verified only on the first article as defined in para. 6.1.

3.1.5.1 The Simulator when used with the Auxiliary PTF P/N 1019962-011. The Star-Horizon Simulator Certification Fixture P/N 1019970-011, and Functional Tester P/N 1016949-011 shall be capable of testing the following OUA P/N 2011000 characteristics.

a. Parallelism of LLOS-HPLOS to an accuracy of 10 arc seconds or better.

b. Parallelism of SLOS-STLOS to an accuracy of 10 arc seconds or better

c. Verifying the Horizon Photometer High Voltage Power Supply Setting to an accuracy of ± 20%.

NOTE: The tolerances specified in para. 3.1.5.1 can not be tested directly and must be deduced from the data and procedures.

3.1.5.2 Any LOS generated by the Star-Horizon Simulator (from the Deflection Mirror Assembly) when the Simulator is mounted on the Auxiliary Precision Test Fixture P/N 1019962-011 shall remain positioned with respect to a fixed OUA or Yoke Position Fixture LOS within a spread of 15 arc seconds for a period of 4 hours subjected to a temperature rise of $10^{\circ}F$ at an average rate of $2.5^{\circ}F$ per hour from $+ 67^{\circ}F \pm 5^{\circ}$.

3.1.5.3 Non-Uniformity Constant. A number for the non-uniformity factor (due to the 23 arc minute field of view of the Normal Probe and the 10 arc minute by 30 arc second field of view of the Optical Unit Horizon Sensor) shall be provided.

3.2 Product Configuration

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G and N Drawing 1019977 and all drawings and engineering data referenced thereon.

3.2.2 Serialization. Each assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

Product Performance and Configuration Requirements/Quality Verification Cross Reference Index.

Performance Requirements	Paragraph Title	Test Verification
3.1.1.1	Focus	4.2.1.1
3.1.2.1	Star Size	4.2.2.1
3.1.2.2	6 Sec. Star Center	4.2.2.2
3.1.2.3	30 Sec. Star Center	4.2.2.3
3.1.2.4	Conversion Factor	4.2.2.4
3.1.2.5	Field of View	4.2.2.5
3.1.2.6	Positioning Accuracy	4.2.2.6
3.1.2.7	SLOS-STLOS Parallelism	4.2.2.7
3.1.2.8	STLOS-Reflectivity	4.2.2.8
3.1.2.9	6 Sec. Star Magnitudes	4.2.2.9
3.1.2.10	30 Second Star Intensity	4.2.2.10
3.1.3.1	Horizon Size	4.2.3.1
3.1.3.2	Horizon Center	4.2.3.2
3.1.3.3	Horizon Uniformity	4.2.3.3.
3.1.3.4	LLOS-HSLOS Parallelism	4.2.3.4
3.1.3.5	HSLOS-Reflectivity	4.2.3.5
3.1.3.6	Horizon Intensity	4.2.3.6
3.1.4.1	Power Supply	4.2.4.1
3.1.5.1	Special Requirements	4.3.1
3.1.5.2	Special Requirements	.3.2
3.1.5.3	Special Requirements	4.3.3
3.2.1	Configuration	4.4

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature:	72°F ± 10°F
b. Relative Humidity:	90% maximum
c. Barometric Pressure:	23 to 32 inches of Hg.

4.2 Tests

4.2.1 Focus

4.2.1.1 Present pre-acceptance certification data that infinity focus of the Simulator-Collimator has been set utilizing a DKM-3 Theodolite, and narrowband filters centered at 5461 Å.

4.2.2 Star Simulation.

4.2.2.1 Measure the diameter of the 6 sec. star and 30 sec. star utilizing a DKM-3 Theodolite and selective green filter.

4.2.2.2 View the 6 sec. star by means of a DKM-3 Theodolite and selective green filter while rotating the simulator collimator in V-blocks. Determine the H and V positions required to center the 6 sec. star.

4.2.2.3 View the 30 sec. star by means of a DKM-3 Theodolite and selective green filter while rotating the Simulator Collimator in V-blocks. Determine the H and V positions required to center the 30 sec. star.

4.2.2.4 View the 6 sec. star with a DKM-3 Theodolite and selective green filter. Align the star motion axes to the DKM-3 reticle axes. Determine the scale factor from H and V micropositioner readings to arc minutes utilizing the azimuth and elevation readings taken with the DKM-3 Theodolite and the corresponding star positions.

4.2.2.5 Utilizing a DKM-3 Theodolite and selective green filter, verify that the 6 sec. star and 30 sec. star are clearly defined over the field of view.

4.2.2.6 Utilizing a DKM-3 Theodolite as in paragraph 4.2.2.4 and selective green filter verify 6 sec. star positioning accuracy at the following positions (referenced to the H and V star center position).

H Arc Min	V Arc Min
+3	±3 ±7
-7	±3 ±7
+12	±12 ±20
-20	±12 ±20
-30	0

4.2.2.7 Mount the Deflection Mirror Assembly P/N 1019913-011, the Mirror Bridge Assembly P/N 1022908-011 and the Star-Horizon Simulator Collimator P/N 1019977-011 on Sliding Platform Assembly P/N 1019979-011. Utilizing the Simulator as an autocollimator determine the parallelism between the SLOS mirror and the Star Tracker LOS mirror. Subject the configuration to a temperature rise of +10°F from the base point of 67°F ± 5°F. Determine parallelism at base point, midpoint of rise and at 10° rise point.

4.2.2.8 Determine the S-4 mirror reflectivity of the Star Tracker LOS mirror by A or B.

A. Certification

Integrated data taken of reflectivity (at 45°) at selected wavelengths from 3000-7000 Å.

B. Measurement

Utilizing a SHS Certification Fixture P/N 1019970-011, with a light stop having a 5/8" diameter clear aperture placed over the probe objective, measure the output of the Simulator with and without the Deflector Mirror Assembly and determine the mirror reflectivity as the ratio of the two readings. This ratio shall be less than 1.

4.2.2.9 Utilizing a calibration curve for the SHS Certification Fixture 1019970-011 (Photometric Units vs Star Magnitude) determine number of photometric units required to obtain specified star magnitudes. Set SHSCF to read output of Simulator 6 sec. star and verify star magnitude output. (Mirror reflection factor and tritium decay values in calibration.)

4.2.2.10 Measure the output of the centered 30 sec. identically to para. 4.2.3.6 except delete Nonuniformity from calibration.

4.2.3 Horizon Simulation

4.2.3.1 Measure the diameter of the simulated horizon using a DKM-3 Theodolite with the green filter.

4.2.3.2 Mount the Star-Horizon Simulator Collimator and SHS Certification Fixture Normal Probe on Sliding Platform Assembly P/N 1019919-011. Determine the H and V micropositioner readings for the center of the horizon by plotting photometer output versus H and V coordinates (2 plots).

4.2.3.3 Verify horizon uniformity from the graphs plotted in 4.2.3.2.

4.2.3.4 Mount the Deflection Mirror Assembly P/N 1019909-011, the Mirror Bridge Assembly P/N 1022908-011 and the Star-Horizon Simulator Collimator P/N 1019977-011 on Sliding Platform Assembly P/N 1019919-011. Utilizing the simulator as an autocollimator determine the parallelism between the HSLOS Mirror and the LLOS Mirror. Subject configuration to a temperature rise of $+10^{\circ}F$ from a base point of $67^{\circ}F \pm 5^{\circ}F$. Determine parallelism at base point, midpoint of rise and at 10° rise point.

4.2.3.5 Determine the mirror reflectivity of the HSLOS Mirror in the region 3400-3600 Å by method A or B.

A. Certification

Integrated data taken of reflectivity (at 45°) at selected wavelengths throughout the range of 3400-3600 Å.

B. Measurement

Utilizing a SHS Certification Fixture P/N 1019970-011 and filter assembly P/N 1022957 measure the output of the Simulator with and without the deflector mirror assembly P/N 1019909-011 and determine the mirror reflectivity as the ratio of the two readings. Reflectivity shall be less than 1.

4.2.3.6 Mount the Simulator Collimator and SHSCF Normal Probe on Sliding Platform Assembly. Set power supply to obtain maximum horizon intensity as required in para. 3.1.3.6. Set neutral density filter at maximum transmission using a certified SHSCF (set the SHSCF sensitivity to value at which SHSCF is calibrated in Photometric Units/(watts/cm^2/steradian). This number shall include tritium decay factors, mirror reflectivity, horizon nonuniformity and filter factors. The neutral density filters shall be varied to obtain the minimum range of horizon intensity as required in para. 3.1.3.6.

4.2.4 Power Supply

4.2.4.1 Utilizing dc voltmeters, ac-vtvm, variac and related test equipment, e.g., load resistors, test the power supply for output voltage, regulation and ripple.

4.3 Special Tests. The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off to determine compatibility with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Perform OUA P/N 2011000 Tracker and Horizon Sensor Tests. Verify GSE measurement tolerances.

4.3.2 Stability. The Star-Horizon Simulator P/N 1019977 shall maintain a line of sight when mounted on the Auxiliary Precision Test Fixture P/N 1019962-011 as specified in para. 3.1.5.2.

4.3.3 Non-Uniformity Constant. Present pre-acceptance certification data for the non-uniformity number. The certification data shall be based on the following procedure.

Utilizing one Normal Probe A (1019944-011) consisting of a 3500 Å filter and a 23 minute light stop, and another Normal Probe B (1019944-011) consisting of the same 3500 Å filter and a 10 minute by 30 second light stop; measure the output of the irradiance standard. Designate the Photovolt Multiplier Assembly (1019971) indications as deflection A and deflection B respectively.

Then measure the Star-Horizon Simulator horizon utilizing Normal Probes A and B and the 3500 Å Filter. Designate Photovolt Multiplier Assembly indications deflection A' and deflection B' respectively.

Complete the following calculation to derive the non-uniformity factor (C).

$$\frac{A}{B} = n \qquad \frac{A'}{B'} = n' \qquad \frac{n'}{n} = C$$

Where: A = Irradiance measured with Normal Probe A
B = Irradiance measured with Normal Probe B
A'= Horizon intensity measured with Normal Probe A
B'= Horizon intensity measured with Normal Probe B

4.4 Drawing Compliance and Mechanical and Visual Inspection. The assembly shall be visually examined for compliance with Apollo G and N drawing 1019977, and all drawings and specifications referenced thereon. The assemblies and subassemblies shall be visually inspected as a minimum for the following.

1. Size, dimension, tolerance, serialization, appearance and markings.
2. Adequacy of materials, parts, and subassemblies; compliance with specific ratings and conformance to applicable specifications
3. Finish, coatings, light leaks, markings, and nameplates, as applicable.

4. Wiring, cabling, welding, soldering, color coding, and terminals, as applicable.

5. Workmanship and cleanup.

5. PREPARATION FOR DELIVERY

5.1 General. Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES

6.1 The special tests required in paragraph 3.1.5 and designated in paragraph 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

REVISIONS 21723				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
—	—	CLASS A RELEASE PER TORR 21723		

THIS UNIT CONSISTS OF THE ITEMS SHOWN IN THE LIST OF MATERIALS BELOW

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
12	1		1022964	02386910504		LIGHT SHROUD ASSY			
11	1		1022945-011	02386910442		RING, MOUNTING, ASSY			
10	1		1022915	02386910092		SHROUD, LIGHT			
9	1		1022914	02386910091		SHROUD, LIGHT			
8	1		1019965	02386910267		SHROUD, LIGHT			
7	1		1022836-011	02386910090		ALIGNMENT TUBE ASSY			
6	1		1019957-011	02386910312		CARRYING CASE (FOR COLLIMATOR)			
5	1		1019981-011	02386910269		CARRYING CASE (FOR DEFLECTORS)			
4	1		1022916-011	01386910048		STAR/HORIZON SIMULATOR POWER SUPPLY			
3	1		1019909-011	02386910235		DEFLECTOR LIGHT BEAM LLOS AND HS			
2	1		1019913-011	02386910238		DEFLECTOR LIGHT BEAM SLOS AND TLOS			
1	1		1019900-011	01386910012		STAR/HORIZON SIMULATOR COLLIMATOR			
	-011	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 01386910028

DRAWN J.D.DUNN DATE 6-1-65
CHECKED 6-14-65
APPROVAL 6-15-65
APPROVAL
NASA APPROVAL 6/13/65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE STAR/HORIZON SIMULATOR

CODE IDENT NO.	SIZE	NASA NUMBER
89944	C	1019977

SCALE ~ WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

APOLLO G&N Specification
PS 1019977 REV. —
Original Issue Date: 21 MAY 65
Release Authority: TDRR 19256
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

STAR-HORIZON SIMULATOR

DRAWING NO. 1019977

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 10 inclusive.

APPROVALS	5/26/65 NASA/MSC	5-20-65 20 May 65 MIT/IL	5-17-65 KIC

1. SCOPE

1.1 This specification establishes the detail requirements for complete identification and acceptance of the Star-Horizon Simulator PART No. 1019977.

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Effective issues.

2.1.2 Unless otherwise specified herein, Military and Government Standards and specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND 1002214	Preservation, Packaging, Container Marking and Packaging, General Requirements for

DRAWINGS

APOLLO G&N

1019977	Star-Horizon Simulator
1019970	Star-Horizon Simulator Certification Fixture
1019926	Star-Horizon Simulator Mounting Fixture

1019962 Aux P.T.F. Stand

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the Contracting Officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this Specification and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of the conflict as soon as it is determined.

a. The contract.
b. This Specification.
c. Documents listed in this section.

3. REQUIREMENTS

3.1 Performance.

3.1.1 Star Simulation

3.1.1.1 The Simulator shall provide two stars, a 6 ± 1 arc second star and a 30 arc second star maximum.

3.1.1.2 The 6 arc second star shall have an S-4 photoelectric magnitude which is variable by means of neutral density filters from -0.5 to + 4.0 (minimum range) as referenced to a star of spectral class A0 (11, 200°K effective color temperature). The Simulator shall have provisions for calibration of the 6 arc second star magnitude within an absolute accuracy of ± 15% with photometer Dwg. 1019970.

3.1.1.3 The 30 arc second star shall be variable in magnitude.

3.1.1.4 The Simulator shall incorporate a provision for exclusive selection of either the 6 arc second star simulation or the 30 arc second star simulation.

3.1.1.5 The 6 arc second star shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970 and by the SLOS (visual) and the Star Tracker Photometer over the entire range of magnitudes specified above except as limited by the specifications for the OUA.

3.1.1.6 The 30 arc second star shall be capable of being sensed simultaneously by the LLOS (visual) and the Horizon Photometer.

3.1.1.7 The Simulator shall be capable of positioning each star within a full field of one degree. The field of star motion shall be centralized about the optical (mechanical) axis of the Simulator within ± 1 arc minute. The Simulator shall provide a micrometer readout for star position. The micrometer readout shall be to an accuracy of 1 arc second or better. The accuracy of the star position when viewed at the OUA shall be ± 3 arc seconds or better when utilizing the central 20 minutes of the field and ± 5 arc seconds or better when using the remainder of the 60 min field. A conversion factor from micrometer reading to arc seconds shall be supplied with the Simulator. A tabulation showing star position with respect to the optical (mechanical) axis of the Simulator vs dial readout shall be supplied.

3.1.2 Horizon Simulation

3.1.2.1 The Horizon size shall be a minimum of 30 arc minutes and shall be centered within 30 arc sec of the Simulator optical axis. The horizon shall be capable of being sensed simultaneously by the calibration photometer Dwg. 1019970, by the SXT LLOS and by the Horizon Photometer of the OUA.

3.1.2.2 The Horizon intensity shall be variable. The ratio of horizon intensity variation shall be 6:1 or greater and shall be totally within the linear range of the Horizon Photometer.

3.1.2.3 The Simulator horizon intensity shall be calibrated to an absolute accuracy of ± 20% utilizing photometer Dwg. 1019970.

3.1.2.4 The relative horizon intensity variation shall be capable of being calibrated as a function of neutral density filter position within 5% utilizing photometer Dwg. 1019970. A calibration chart of this function shall be provided.

3.1.3 **Intensity Variation**

3.1.3.1 It shall be possible to read the position of the neutral density counter-rotating filters within 0.6 degrees, and to an accuracy of 0.6 degrees or better.

3.1.4 **Power Supplies**

3.1.4.1 The power supply shall operate from 115V ±10%, 50-60 cps ± 5%. The dc output voltage of the power supply shall be regulated to 0.1% under normal load when the input voltage is varied by 10%. The peak to peak output ripple shall not exceed 3 millivolts.

3.1.5 **Shrouds**

3.1.5.1 The shrouds shall preclude extraneous light from entering the optical path between the following:

1. Autocollimator and mirror array assembly
2. Mirror array assembly and the calibration photometer
3. Mirror array assembly and the OUA

3.1.6 **Folding Mirrors**

3.1.6.1 Each mirror array assembly shall contain two precision mirrors. The plane parallelism of the reflecting surfaces of the two mirrors shall be within 4 arc seconds, and shall be calibrated (Known) to 1 arc second or better.

3.1.6.2 The mirror array assembly which is used with the Horizon Photometer shall have a narrow band pass filter in the Calibration Photometer light path. This filter shall have a center wavelength of 3500 A° ± 25A° and a bandwidth of 200 A° ± 5%. The filter shall have polished, parallel surfaces, and shall have a transmission characteristic greater than 40% at 3500 A°.

3.1.7 **Mechanical Stability**

3.1.7.1 The Simulator, when used with the Star-Horizon Simulator Mounting Fixture 1019926, or Aux. PTF Stand Dwg. 1019962, shall remain stable to meet the optical and photometric accuracy requirements as outlined herein for a minimum of 4 hours over the temperature varying between 67°F and 77°F.

3.1.8 Lamps

3.1.8.1 The lamps which provide the light for the Star and horizon sources shall not require operation at a voltage greater than their rated voltage except for Horizon alignment. The lamps shall have a rated life of 50 hours minimum at rated voltage.

3.1.9 Certification

3.1.9.1 Overall alignment checks required for certification immediately prior to and after tests shall be capable of being performed to the accuracy specified herein without removing the Simulator from its test mounts.

3.2 Product Configuration

3.2.1 Drawings - The configuration of the assembly shall be in accordance with Apollo G&N Drawing 1019977 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - The Contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 The failure on an end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When nonconformance units are corrected by the Contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the nonconformance or, when so directed by the cognizant inspector, a complete re-examination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the Contractor to the cognizant NASA representative.

4.1.2 Test Conditions

4.1.2.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: 25° ± 10° C

(b) Relative Humidity: 90% max

(c) Barometric Pressure: 23 to 32 inches of Hg

4.2 **Tests**

4.2.1 Mount the Simulator collimator on V blocks. Illuminate the Simulator Star lamp. View the star image by means of an auxiliary autocollimator or theodolite.

4.2.2 Select the 6 arc second star. Move the position of the 6 arc second star by means of the micrometer dials until a minimum motion of star is observed when the Simulator collimator is rotated in its V blocks.

4.2.3 Note the reading of the x and y micrometer dials. This shall define the center of the 6 arc sec star field and the center position for the star in the collimator.

4.2.4 Observe that only the 6 arc second star is visible.

4.2.5 Observe that the size of the star is 6 ± 1 arc seconds and is clearly defined over the entire 1° field of view. Verify star positional accuracy for the positions given in Table 1.

MICROMETER OFFSET		CIRCULAR ERROR LIMITATIONS
$\dot{x}$ ARC MIN	$\dot{y}$ ARC MIN	ALLOWABLE MISALIGNMENT
+3	± 3	-
	± 9	± 3 arc sec
+9	± 3	-
	± 9	± 3 arc sec
-3	± 3	
	± 9	± 3 arc sec
-9	± 3	
	± 9	± 3 arc sec
+ 20	± 12	
	± 20	± 5 arc sec
	± 30	
+ 30	± 12	
	± 20	
	± 30	± 5 arc sec
- 20	± 12	
	± 20	
	± 30	± 5 arc sec
-30	± 12	
	± 20	
	± 30	± 5 arc sec

Table 1. Star Positional Accuracy

4.2.6 Vary the illumination of the Simulator Star lamp 15% above and below its normal value. Observe that no deterioration of focus occurs, and that the star diameter is constant.

4.2.7 With the Star lamp illumination set at 15% above its normal illumination vary the neutral density filters. The star brightness shall vary smoothly and no deterioration of star focus shall occur. The star size shall remain constant. The star image position shall not shift.

4.2.8 Leave the Star Lamp illuminated at 100% of its normal value for a period of 4 hours in an ambient temperature which can vary from 67°F to 77°F. No deterioration of focus shall be observed. The star image shall not shift position.

4.2.9 Return the 6 arc star to the original center setting as determined by the viewing telescope. It shall be identical to the previous reading of the x and y micrometer dials within ± 3 arc seconds.

4.2.10 Select the 30 arc second star. Determine the center position of its field of view. Observe the star is a maximum of 30 arc seconds and is clearly defined over its entire field of view. Observe that the 30 arc second star is the only star visible.

4.2.11 Mount the Simulator on V blocks. Illuminate the Simulator Star lamp (normal illumination). Set the star (SLOS - Star Tracker) mirror array assembly in place. Select the 6 arc second star and monitor the light output of the mirror array assembly with photometer Dwg. 1019970. The light output sha smoothly vary from a -0.5 to a +4.0 S4 photoelectric magnitude as the neutral density filters are varied. The measureme shall be made to an absolute accuracy of ± 15%. Calibrate the star magnitude vs neutral density filter position.

4.2.12 Set the star illumination at 100% of normal. Observe the photometer meter reading. The meter reading shall not vary more than ± 2% as the star position is varied within the central 20 minutes of the field, during a 4 hour period when the Simulator is in an ambient temperature of 72 ± 5°F.

4.2.13 Replace the Star Tracker mirror array assembly with the "Horizon" mirror array assembly. Monitor the light output of the mirror array assembly. The light output of the 30 arc second star in the spectral range 3400-3600Å shall be a minimum of ____________. Remove the power from the Star lamp and apply normal power to the Horizon lamp. Vary the horizon neutral density filter position. The photometer readout shall smoothly vary from a minimum of   to six times that value. The light output shall be measured to an absolute accuracy of ± 20%. The time to vary the horizon intensity over the 6:1 range specified above shall be less than one minute. A calibration shall be made of horizon intensity vs neutral density filter setting.

4.2.14 View the Horizon Simulator with an autocollimator. Determine the size of the horizon field of view. The field shall be 30 arc min. minimum.

4.2.15 Place the calibration photometer Dwg. 1019970 on a turntable. Knowing its field of view, scan the Horizon Simulator across its field for a minimum of 30 arc minutes minus the field of the photometer. The photometric meter reading shall not vary more than 2% over the field of view. Verify Horizon Simulator centralization in a manner similar to star centralization previously described.

4.2.16 Use two symmetrical apertures designed to allow approximately 20% of the light from the Simulator collimator to be sensed. One mask should allow light from the center of the collimator lens only to be sensed. Another should allow light from the symmetrical extremes of the collimator lens to be sensed. Plots of the relative magnitudes of the 6 arc second star vs neutral density filter position for each of the masks shall be identical within ± 2%.

4.2.17 Utilizing the Simulator as an autocollimator (6 sec star illuminated, microscope attached) verify the mirrors in each mirror array assembly are parallel within 4 arc seconds. Determine exact angle to 1 arc sec.

4.2.18 Verify results obtained in 4-2.17 over the entire field of view using a 6" autocollimator capable of viewing both lines of sight simultaneously.

4.2.19 Utilizing dc volt meters, oscilloscopes, variacs, and related test equipment verify power supply regulation to be better than 0.1%, and power supply ripple to be less than 3 millivolts at normal voltage used to illuminate lamps, when the input voltage is varied by ± 10%.

4.2.20 Replace the Star Simulator lamp. Retest for focus and calibration. The focus shall not have deteriorated. The light output shall be adjustable to fall within 5% of the data taken previously. Recalibrate.

4.3 Special Tests—The first article produced by any vendor under the provisions of this Procurement Specification shall be subjected to additional tests prior to sell-off to determine compatability with prime mission requirements as specified and referenced herein. These tests shall be subject to approval by MIT, or its designated representative and shall be held in the vendor's plant or at any NASA designated Field Site, as applicable.

4.3.1 Alignment of the Star-Horizon Simulator to the OUA and to the Star-Horizon Simulator Certification Fixture shall be verified to the tolerances specified and referenced herein when the above units are mounted on the Aux PTF Stand and undergo a temperature cycle.

4.3.2 The light outputs of the Star-Horizon Simulator shall be compatible with the visual and photometric requirements specified and referenced herein.

4.3.3 The Star-Horizon Simulator shall be capable of mounting on the Star-Horizon Simulator Holding Fixture and of being properly aligned on same.

4.3.4 There shall be no equipment interferences between the equipment used for Photometric tests, nor between these equipments and the equipments normally found at the various test sites.

4.3.5 The shrouds shall prevent extraneous light from entering the test configuration.

4.3.6 Repeat 4.2.8 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.3.7 Repeat 4.2.12 using 115% of rated voltage. The bulb may burn out without disqualifying the test data.

4.4 Drawing Compliance - The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 1019977. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General - Preparation for delivery shall be in accordance with Specification ND 1002214.

6. NOTES.

6.1 The special tests designated in para. 4.3 shall be performed on the first article produced by any vendor to assure compliance with prime mission requirements as specified and referenced herein.

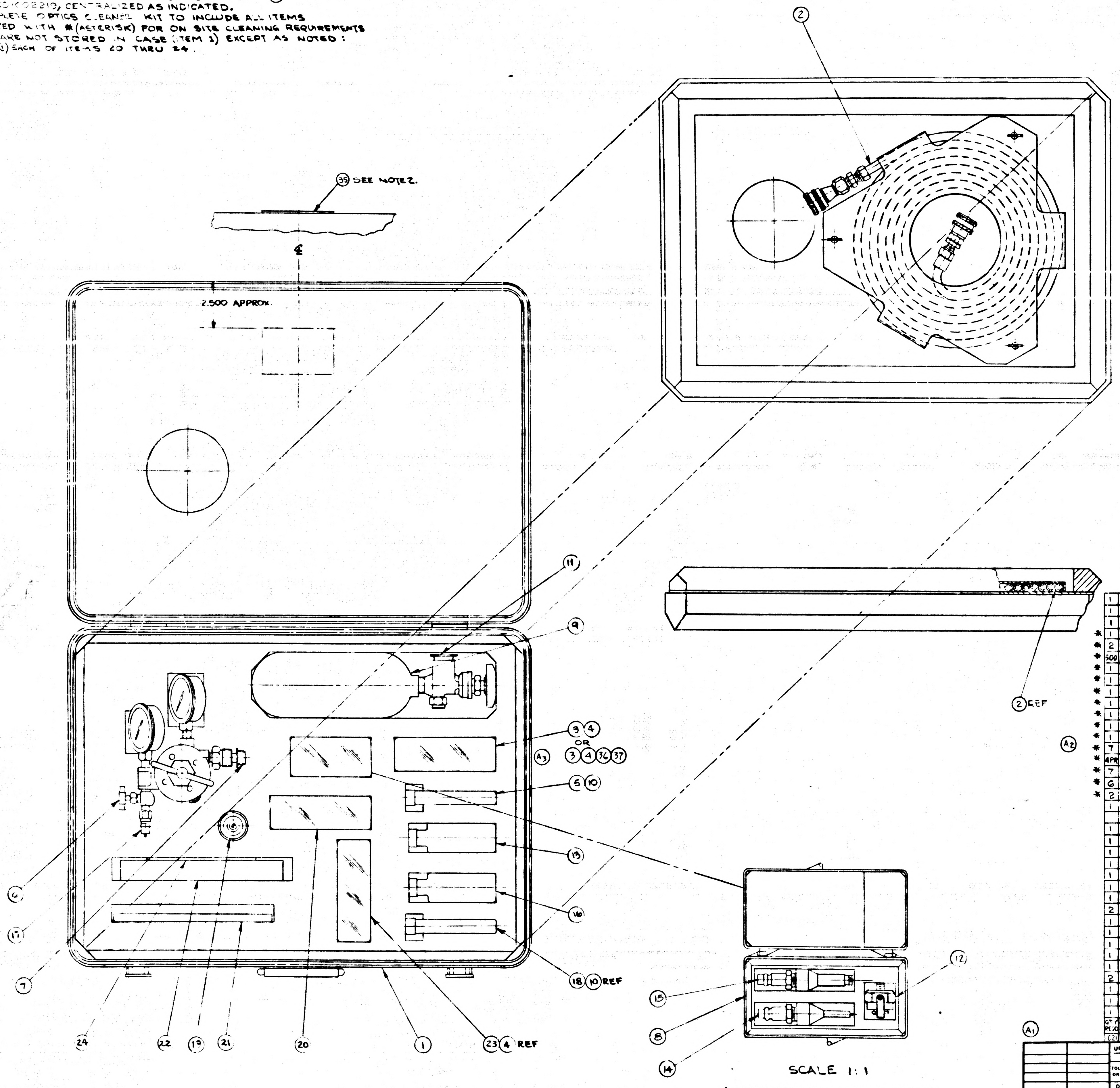
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A4		REVISED PER E[illegible] 16245 [illegible] 34287 DATE 3/4/67	[illegible]	

NOTES:-

1- INTERPRET DWG PER MIL-D-70327

2- MARK AT ASSEMBLY "OPTICS CLEANER KIT" AND PART NO. 1019984-011 OR "1019984-021" APPLY PER NS K02219, CENTRALIZED AS INDICATED. (A4)

3- COMPLETE OPTICS CLEANER KIT TO INCLUDE ALL ITEMS MARKED WITH *(ASTERISK) FOR ON SITE CLEANING REQUIREMENTS AND ARE NOT STORED IN CASE (ITEM 1) EXCEPT AS NOTED: ONE (1) EACH OF ITEMS 20 THRU 24.



SCALE 1:1

▲ PURCHASED ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

	QTY REQD	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	1	37	—		1022789-011			AIR CHUCK AND PL[illegible] ASSY			
	1	36	—		1022788-011			ADAPTOR AS[illegible]			
	1	35	1		1004260-307	03386911567		PLATE, IDENTIFICATION			
*	1	34	1	▲	1001866	033869112[illegible]		BRUSH, STATIC ELIMINATOR			
*	2	33	2	▲	1001860	03386911192		DISH, ALUMINUM			
*	500	32	500	▲	1001859	03386911191		CONE, TIP. VACUUM LINE			
*	1	31	1		1022887-011	0238691033[illegible]		HOSE ADAPTER ASSY			
*	1	30	1		1022370	03386911235		ADAPTER, VACUUM LINE TIP			
*	1	29	1		1022381	03386911343		HOSE, VACUUM CLEANER			
*	1	28	1	▲	1001876	03386911312		BAG, VACUUM CLEANER			
*	1	27	1	▲	1001872	02386910369		VACUUM CLEANER			
*	1	26	1		1022889-011	02386910316		FILLING FIXTURE, NITROGEN CYLINDER			
*	1	25	1	▲	1001820	03386911078		LAMP, HIGH INTENSITY			
*	7	24	7		1022330	03386911085		ROD, SHAPED			
*	4PR	23	4PR	▲	1001861	033869111[illegible]3		GLOVES, NYLON			
*	7	22	7		1022327	03386911189		STRAIGHT EDGE WIPING			
*	6	21	6	▲	1001865	03386911202		LENS PAPER, PAD			
*	2	20	2	▲	1001867	03386911204		BRUSH, STATIC ELIMINATOR			
	1	19	1	▲	1001864	03386911201		WATCHMAKER'S LOUPE			
		18			1022879-021	02386910356		TUBE ASSY			
	1	17	1	▲	1001877	03386911316		COUPLING, PLUG			
	1	16	1		1022878-021	023869101[illegible]		BOTTLE ASSY (AEROSOL SOAP SOLUTION			
	1	15	1		1022890-011	02386910374		GAS INJECTION FITTING ASSY			
	1	14			1022891-011	023869103[illegible]3		FITTING, GAS INJECTION ASSY			
	1	13	1		1022878-011	0238691011[illegible]		BOTTLE ASSY (ALCOHOL ISOPROPYL)			
	1	12	1		1022893-011	02386910[illegible]		GAS INJECTION VALVE ASSY			
	1	11	1	▲	1001773-006	03386910053-6		PLUG CAP			
	2	10	2	▲	1001822	03386911081		PIPET, STRAIGHT			
	1	9	1	▲	1001883	03386911068		CYLINDER, NITROGEN			
	1	8	1		1022888-011	02386910[illegible]7		STORAGE BOX ASSY			
	1	7		▲	1001773-002	03386910053-2		PLUG CAP			
	1	6	1	▲	1001870	02386910124		PRESSURE REGULATOR, TWO STAGE			
	1	5	1		1022873-011	[illegible]		TUBE ASSY			
	2	4	2	▲	1001862	03386911194		BOX, PLASTIC			
	1	3	1	▲	1001821	03386911080		SYRINGE, AIR			
	1	2	1		1022872-011	[illegible]		HOSE ASSY			
	1	1	1		1022882-011	[illegible]		CASE STORAGE ASSY			
	-021		-011								

LIST OF PARTS AND MATERIALS

(A1)

NEXT ASSY	USED ON
1900030	1900030

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

CONTRACT NAS9-497

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 013869C[illegible]

DRAWN T-OMM[illegible]Z DATE [illegible]
CHECKED [illegible] 5-13-[illegible]
APPROVAL [illegible]
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL

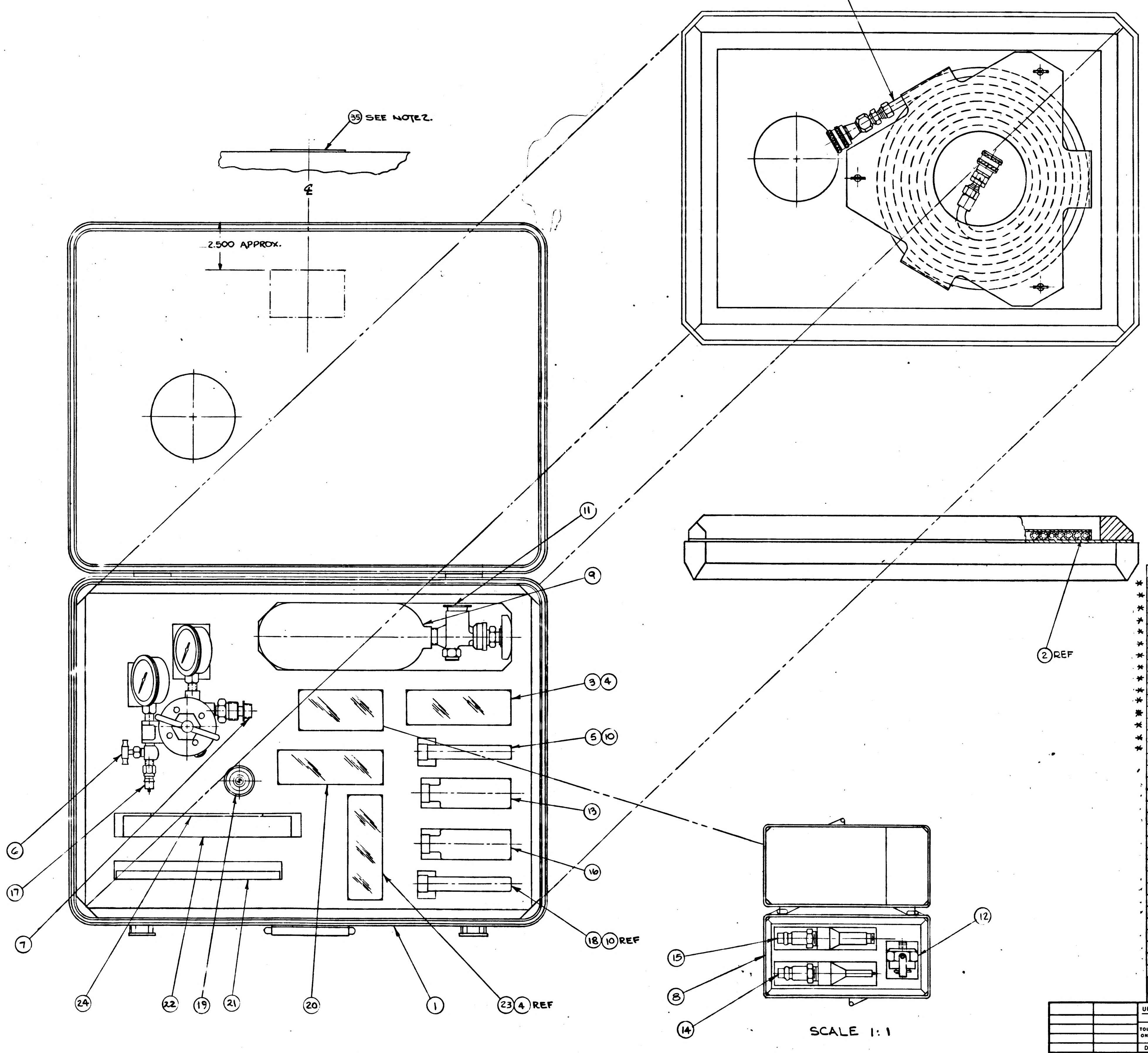
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICS CLEANER KIT

CODE IDENT NO [illegible]944 SIZE E NASA NUMBER 1019984
SCALE WEIGHT CALC ACTUAL SHEET OF

NOTES:-
1-INTERPRET DWG PER MIL-D-70327
2- [illegible]K TITLE "OPTICS CLEANER KIT" AND PART NO. "1019984-011"
[illegible] HIGH CHARACTERS PER ND 1002019, APPLY PER 1002219
[illegible]NTRALIZED AS INDICATED.
3 COMPLETE OPTICS CLEANER KIT TO INCLUDE ALL ITEMS
MARKED WITH *(ASTERISK) FOR ON SITE CLEANING REQUIREMENTS
AND ARE NOT STORED IN CASE (ITEM 1) EXCEPT AS NOTED:
ONE (1) EACH OF ITEMS 20 THRU 24.

REVISIONS 20503 6-28-6?				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION
35	1		1004260-307	03386911567		PLATE, IDENTIFICATION		
* 34	1		1001866	03386911203		BRUSH, STATIC ELIMINATOR		
* 33	2		1001860	03386911192		DISH, ALUMINUM		
* 32	500		1001859	03386911191		CONE, TIP, VACUUM LINE		
* 31	1		1022887-011	02386910333		HOSE ADAPTER ASSY		
* 30	1		1022370	03386911235		ADAPTER, VACUUM LINE TIP		
* 29	1		1022381	03386911343		HOSE, VACUUM CLEANER		
* 28	1		1001876	03386911312		BAG, VACUUM CLEANER		
* 27	1		1001872	02386910369		VACUUM CLEANER		
* 26	1		1022889-011	02386910316		FILLING FIXTURE, NITROGEN CYLINDER		
* 25	1		1001820	03386911078		LAMP, HIGH INTENSITY		
* 24	7		1022330	03386911085		ROD, SHAPED		
* 23	4PR		1001861	03386911193		GLOVES, NYLON		
* 22	7		1022327	03386911189		STRAIGHT EDGE, WIPING		
* 21	6		1001865	03386911202		LENS PAPER, PAD		
* 20	2		1001867	03386911204		BRUSH, STATIC ELIMINATOR		
19	1		1001864	03386911201		WATCHMAKER'S LOUPE		
18			1022879-021	02386910356		TUBE ASSY		
17	1		1001877	03386911316		COUPLING, PLUG		
16	1		1022878-021	02386910111		BOTTLE ASSY (AEROSOL SOAP SOLUT		
15	1		1022890-011	02386910374		GAS INJECTION FITTING ASSY		
14	1		1022891-011	02386910373		FITTING, GAS INJECTION ASSY		
13	1		1022878-011	02386910110		BOTTLE ASSY (ALCOHOL ISOPROP		
12	1		1022893-011	02386910380		GAS INJECTION VALVE ASSY		
11	1		1001773-006	03386910053-6		PLUG, CAP		
10	2		1001822	03386911081		PIPET, STRAIGHT		
9	1		1001883	03386911088		CYLINDER, NITROGEN		
8	1		1022888-011	02386910337		STORAGE BOX ASSY		
7	1		1001773-002	03386910053-2		PLUG, CAP		
6	1		1001870	02386910124		PRESSURE REGULATOR, TWO STAGE		
5	1		1022879-011	02386910355		TUBE ASSY		
4	2		1001862	03386911194		BOX, PLASTIC		
3	1		1001821	03386911080		SYRINGE, AIR		
2	1		1022892-011	02386910361		HOSE ASSY		
1	1		1022882-011	02386910378		CASE STORAGE ASSY		
	-011							

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 01386910049
DRAWN T. LOMNITZ DATE 5-11-65
CHECKED N. Kessler 5-13-65
APPROVAL [illegible] 5-13-65
APPROVAL
NASA APPROVAL A. C. [illegible]
MIT APPROVAL [illegible] 6-2-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICS CLEANER KIT

CODE IDENT NO. 89944
SIZE E
NASA NUMBER 1019984
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 1 OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14299

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15158 RJ	1/4/1965	WK

-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	END ITEMS	EQUIP CODE	FIND NO.
			1005707	1005707					1005727	WIRING HARNESS AGC TO PSA AND G/N TO SPACECRAFT	55	8
										OPTICAL SHROUD & COVER		7
										CONTROL ELECTRONICS ASSY		6
										D & C ELECTRONICS ASSY		5
					1001471	1001471	1001471	1001471		HOSE ASSY, FLEX. (OPTICS BASE TO IMU)	55	4
					1001470	1001470	1001470	1001470		HOSE ASSY, FLEX. (IMU TO SPACECRAFT)	55	3
					1001469	1001469	1001469	1001469		HOSE ASSY, FLEX. (SPACECRAFT TO OPTICS BASE)	55	2
					1007121	1007121	1007121	1007121		SIGNAL CONDITIONER ASSEMBLY	30	1

NOTES:

1. THIS DWG DEFINES CONFIGURATION OF END ITEMS PER SYSTEM UP UNTIL THE TIME OF DELIVERY TO NASA.
2. REF. DWGS.— G & N C/M SUPPORTING DOCUMENTS LIST # 1019999
3. THIS DRAWING FOR REFERENCE ONLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

SIGNATURES		DATE
DRAWN	U. Mummolo	11/11/64
CHECKED		11/11/64
DESIGNER		
ENGINEER	WKupfer	

MIT APPROVAL WKupfer 13 Nov 64
APPROVED MSC WJ Rhine 11-13-64

INSTRUMENTATION LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASS.

G & N COMMAND MODULE
MISCELLANEOUS END ITEMS

CODE IDENT NO.	SIZE	DRAWING NO.
	D	1019998

SCALE | WT | SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14299

SYM	DESCRIPTION	DATE	APPROVAL

-031	-021	-011	-000	END ITEMS	EQUIP CODE	FIND NO.
						8
				OPTICAL SHROUD & COVER		7
				CONTROL ELECTRONICS ASSY		6
				D & C ELECTRONICS ASSY		5
1001471	1001471	1001471	1001471	HOSE ASSY, FLEX. (OPTICS BASE TO IMU)	55	4
1001470	1001470	1001470	1001470	HOSE ASSY, FLEX. (IMU TO SPACECRAFT)	55	3
1001469	1001469	1001469	1001469	HOSE ASSY, FLEX. (SPACECRAFT TO OPTICS BASE)	55	2
1007121	1007121	1007121	1007121	SIGNAL CONDITIONER ASSEMBLY	30	1

NOTES:

1. THIS DWG DEFINES CONFIGURATION OF END ITEMS PER SYSTEM UP UNTIL THE TIME OF DELIVERY TO NASA.
2. REF. DWGS.—G & N C/M SUPPORTING DOCUMENTS LIST *____________
3. THIS DRAWING FOR REFERENCE ONLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

SIGNATURES		DATE
DRAWN	U. Mummolo	11/11/64
CHECKED		11/11/64
DESIGNER		
ENGINEER		
MIT APPROVAL	W Kupfer 13 Nov 64	
APPROVED MSC	W J Rhine 11-13-64	

INSTRUMENTATION LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASS.

G & N COMMAND MODULE
MISCELLANEOUS END ITEMS

CODE IDENT NO.	SIZE	DRAWING NO.
	D	1019998
SCALE	WT	SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						14299
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			1/4/65	w.k.

	-151	-141	-131	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS
																	1010075	APOLLO G & N STRUCTURE GROUNDS DIAGRAM	
												1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM	
																	1010077	APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM	
																	1010078	APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM	
																	1010079	APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM	
																	1010080	APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM	
																	1010081	APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM	
																	1010082	APOLLO INERTIAL SUBSYSTEM +28 V[illegible] POWER DISTRIBUTION DIAGRAM	
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 320[illegible] CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM	
										1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28 [illegible] 32, +120 VDC POWER DISTRIBUTION DIAGRAM	
										1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 2[illegible]%, 28V 5% 800 CPS POWER DIST DIAGRAM	
										1010137			1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DI[illegible]AM	
										1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTE[illegible] ONE WIRE MECHANIZATION DRAWING	
										1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS	
										1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS	
										1010135			1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM	
										1010136			1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM	
																	1021001	APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT	
										1015000			1015000	1015000	1015000	1015000		F T M FOR APOLLO G & N SYSTEM	
										1015497			1015497	1015497	1015497	1015497		A T P FOR APOLLO. G. & N. INERTIAL SUBSYSTEM	
										1015100			1015100	1015100	1015100	1015100		A T P FOR APOLLO G & N OPTICS SUBSYSTEM	
										1015000			1015000	1015000	1015000	1015000		A T R PRE-INSTALLATION. FOR APOLLO G & N SYSTEM	
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL	
																	1021036	GUIDANCE AND NAVIGATION SYSTEM, CMRM	
																	1021067	OPTICAL UNIT SYSTEM, CMRM	
																	1021069	MAP AND DATA VIEWER, CMRM	
										1010139			1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM	
																	1010038	IMU/CDU FUNCTIONAL DIAGRAM	
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM	
										1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM	
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C	
										1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING	
										1014999			1014999	1014999	1014999	1014999		INSTALLATION LIST APOLLO GUIDANCE EQUIPMENT	
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC	
										1010138			1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC	
									1009502	1015100		1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM	

G & N SYSTEM CONFIGURATION DASH NO.

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN U.V. Muscarelo
CHECKED
APPROVED
APPROVED W Kupfer
APPROVED MIT W Kupfer 13 Mar
APPROVED MSC
DATE

G & N COMMAND MODULE SUPPORTING DOC. LIST

CODE IDENT NO.
SIZE E
DRAWING NO. 1019999
SCALE
SHEET 1 OF 1

MASTER

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14299

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15153			1/11/65	WK
B		REVISED PER TDRR 20917.			6/2/65	

										1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM	
										1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM	
										1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM	
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM	
										1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM	
										1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM	
										1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM	
										1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM	
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM	
										1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM	
										1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM	
						1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM	
										1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING	
										1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS	
										1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS	
						1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM	
						1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM	
						1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS	
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT	
										1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM	
										1015497			1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N. INERTIAL SUBSYSTEM	
						1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM	
										1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATR PRE-INSTALLATION FOR APOLLO G & N SYSTEM	
						1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION	
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL	
						1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM	
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM	
						1009518	1009518	1009518	1009518									TRACKER MODE	
						1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM	
						1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM	
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM	
						1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM	
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C	
										1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING	
						1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999		INSTALLATION LIST APOLLO GUIDANCE EQUIPMENT	
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC	
						1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC	
						1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM	
						-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS
						121-124	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY		

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN U.V. Muramoto
CHECKED
APPROVED
APPROVED W. Kupfer
APPROVED MIT W. Kupfer 13 Mar 64
APPROVED MSC 11-15-64
DATE

G & N COMMAND MODULE
SUPPORTING DOC. LIST

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE
SHEET 1 OF 1

1019999 B

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

Ⓡ

14299

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			1/4/65	WK
B		REVISED PER TDRR 20914				WK
C		REVISED PER TDRR 22254				

-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
121-124	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			
				1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
				1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
				1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
				1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
				1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
				1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
				1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
				1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
				1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
				1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
				1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
				1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
				1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
				1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
				1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
											1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
											1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
				1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
														17
							1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
														15
														14
1009518	1009518	1009518	1009518									TRACKER MODE		13
1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
				1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
											1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
														7
				1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999	1014999		INSTALLATION LIST APOLLO GUIDANCE EQUIPMENT		5
				1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
														2
1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. Muranaka
CHECKED
APPROVED
APPROVED
APPROVED MIT WKupfer 13 MAY
APPROVED MSC WJ Robinson
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH FINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						14299
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			3/4/65	WK
B		REVISED PER TDRR 20914			7/20/65	WK
C		REVISED PER TDRR 22254			[illegible]	[illegible]
D		REVISED PER TDRR 23622			11-2-65	WK

										1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
										1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
										1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
										1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
										1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
										1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
										1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
										1010084			1010084	1010084	1010084	1010[illegible]		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
										1010085			1010085	1010085	1010085	1010[illegible]		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
			1009515	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	101013[illegible]		TRUNNION MANUAL MODE DIAGRAM		34
										1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
										1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
										1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			1009516	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			1009513	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			1009512	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		F T M FOR APOLLO G & N SYSTEM		25
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		A T P FOR APOLLO G. & N. INERTIAL SUBSYSTEM		24
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	015100		A T P FOR APOLLO G & N OPTICS SUBSYSTEM		23
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		A T R PRE-INSTALLATION. FOR APOLLO G & N SYSTEM		22
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			1021041	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
																				17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																				15
																				14
			1009518	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			1009517	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			1009548	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			1009547	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
										1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			1009514	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1
			-111	-111	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			124	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

ND 1000000	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED [illegible] 11-13-64
APPROVED
APPROVED W Kupfer
APPROVED MIT W Kupfer 13 May 65
APPROVED MSC W J [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE —
SHEET 1 OF 1

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

14299

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			1/4/65	WK
B		REVISED PER TDRR 20917			5/20/65	WK
C		REVISED PER TDRR 22254			8/1/65	
D		REVISED PER TDRR 23622			11 2 65	WK
E		REVISED PER TDRR 24253	RAJ		11 15 65	WK

-111	-111	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
124	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			
1009581	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
1009573	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
1009572	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
							1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
1009574	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
1009577	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
1009582	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
1009576	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
							1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
1009579	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
1009578	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
1009515	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
1009575	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
1009549	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
1009550	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
1009516	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
1009513	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
1009512	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
							1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
														1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
														1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
1021041	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
							1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
																	17
										1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																	15
																	14
1009518	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
1009517	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
1009548	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
							1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
1009547	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
														1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																	7
1009580	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																	5
							1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
1009514	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																	2
1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:
1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED [illegible] 11-13-64
APPROVED
APPROVED
APPROVED MIT W Kupfer 13 [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE —
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

14299

F

REVISIONS							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 15158			1/4/65	WK	
B		REVISED PER TDRR 20914			7/20/65	WK	
C		REVISED PER TDRR 22254					
D		REVISED PER TDRR 23622			11-2-65	WK	
E		REVISED PER TDRR 24253	RAJ		11-5-65	WK	
F		REVISED PER TDRR 24492	RAJ		12-7-65	WK	

			-121	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			124	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			
			1009581	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			1009573	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			1009572	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			1009574	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			1009577	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			1009582	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			1009576	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			1009579	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
			1009578	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
			1009515	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			1009575	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
			1009549	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			1009550	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			1009516	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			1009513	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			1009512	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			1021041	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
																				17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
			1007570	1007570	1007570	1007570	1007570	1007570	1007570		1007400	1007400						PS FOR PSA TRAY ASSEMBLIES (SPARES)		15
			1007570	1007570	1007570	1007570	1007570	1007570	1007570		1007400	1007400						FTM FOR PSA TRAY ASSEMBLIES (SPARES)		14
			1009518	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			1009517	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			1009548	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			1009547	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			1009580	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			1009514	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. Muzzopolo 11-13-64
CHECKED 11-13-64
APPROVED
APPROVED W Kupfer
APPROVED MIT W Kupfer 13 Nov
APPROVED MSC W J Rhine
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE —
SHEET 1 OF 1

MASTER

1019999

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						14299
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			1/4/65	
B		REVISED PER TDRR 20914			2/20/65	
C		REVISED PER TDRR 22254			[illegible]	
D		REVISED PER TDRR 23622			11 2 65	
E		REVISED PER TDRR 24253	RAJ		[illegible]	
F		REVISED PER TDRR 24492	RAJ		[illegible]	
G		REVISED PER TDRR 30691	JJB		[illegible]	

			1009581	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			1009573	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			1009572	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			1009574	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			1009577	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			1009582	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			1009576	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			1009579	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
			1009578	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
			1009515	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			1009575	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
			1009549	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			1009550	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			1009516	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			1009513	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			1009512	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		F T M FOR APOLLO G & N SYSTEM		25
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		A T P FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		A T P FOR APOLLO G & N OPTICS SUBSYSTEM		23
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		A T P PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			1021041	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
																				17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
			1007570	1007570	1007570	1007570	1007570	1007570	1007570		1007400	1007400						PS FOR PSA TRAY ASSEMBLIES (SPARES)		15
			1007570	1007570	1007570	1007570	1007570	1007570	1007570		1007400	1007400						FTM FOR PSA TRAY ASSEMBLIES (SPARES)		14
			1009518	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			1009517	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			1009548	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			1009547	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			1009580	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			1009514	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1
			-131	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			124	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN U. V. Muzzonolo 11-13-64
CHECKED 11-13-64
APPROVED
APPROVED
APPROVED MIT 13 Mar
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLC[illegible]

CODE IDENT NO. 80230
SIZE E
DRAWING NO. [illegible]9999
SCALE —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

14299

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVAL
A		REVISED PER TDRR 15258			1/4/65	
B		REVISED PER TDRR 20914				
C		REVISED PER TDRR 22254				
D		REVISED PER TDRR 23622			11-2-65	
E		REVISED PER TDRR 24253	RAJ		11-15-65	
F		REVISED PER TDRR 24492	RAJ		12-7-65	
G		REVISED PER TDRR 30691	JJB	JL	8-24-66	
H		REVISED PER TDRR 32003	RED		11-28-66	

						1002324												ND POST INSTALLATION C/O SPEC. FOR G&N SYSTEM S/C 14		47
				1002320														ND ACE-S/C DISPLAY & CONTROL FOR S/C 20 AT KSC		46
			1009581	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			1009573	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			1009572	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			1009574	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			1009577	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			1009582	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			1009576	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			1009579	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO-INERTIAL SUBSYSTEM -28,+12,+32,+120 VDC POWER DISTRIBUTION DIAGRAM		36
			1009578	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5%, 800 CPS POWER DIST DIAGRAM		35
			1009515	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			1009575	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
			1009549	1008549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			1009550	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			1009516	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			1009513	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			1009512	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
			1026000	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			1021041	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
																				17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																				15
																				14
			1009518	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			1009517	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			1009548	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			1009547	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			1009580	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			1009514	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			1009502	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1
			-131	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			124	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED [illegible] 11-13-64
APPROVED
APPROVED
APPROVED MIT 13 Nov
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE
SHEET OF

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

(F)

14299

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15258				
B		REVISED PER TDRR 20217				
C		REVISED PER TDRR 22254				
D		REVISED PER TDRR 23622			11-2-65	
E		REVISED PER TDRR 24253	RAJ		11-15-65	
F		REVISED PER TDRR 24492	RAJ		12-7-65	
G		REVISED PER TDRR 30691	JJB	JL	8-24-66	
H		REVISED PER TDRR 32003	RED	RW	11-28-66	
J		REVISED PER TDRR 32168	WRB	CP	12-10-66	

			~~-131~~ ~~124~~	-121 123	-111 122	-101 121	-091 111	-081 110	-071 109	-061 20	-051 17	-041 12	-031 8	-021 7	-011 6	-000 5	EFFECTIVITY UNDEFINED G & N EFFECTIVITY	TITLE	REMARKS	FIND NO.
				ND1021039	ND1021039	ND1021039	ND1021039	ND1021039	ND1021039									AUXILIARY GROUND SUPPORT EQUIPMENT MANUAL		50
				ND1021038	ND1021038	ND1021038	ND1021038	ND1021038	ND1021038									PACKING, SHIPPING, & HANDLING MANUAL		49
										ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034		ASSOCIATED TEST EQUIPMENT CMRM		48
				ND1002324	ND1002326	1002324												ND POST INSTALLATION C/O SPEC. FOR G&N SYSTEM ~~S/C 14~~		47
				1002320														ND ACE-S/C DISPLAY & CONTROL FOR S/C 20 AT KSC		46
			~~1009581~~	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			~~1009573~~	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			~~1009572~~	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			~~1009574~~	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			~~1009577~~	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			~~1009582~~	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			~~1009576~~	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			~~1009579~~	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, -32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
			~~10095~~	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST. DIAGRAM		35
			~~10 15~~	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			~~10 75~~	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
			~~10 549~~	1008549	1009549	1009549	1009549	1009549	1009549	1015561			1015551	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			~~1009550~~	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			~~1009516~~	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			~~1009513~~	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			~~1009512~~	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
			~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			~~1021041~~	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
										ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035		OPTICS INERTIAL TEST SET CMRM		17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																				15
																				14
			~~1009518~~	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			~~1009517~~	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			~~1009548~~	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			~~1009547~~	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			~~1009580~~	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			~~1009514~~	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING.

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED 11-13-64
APPROVED
APPROVED
APPROVED MIT 13 Nov
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE
SHEET OF

14299

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15258			1/4/65	
B		REVISED PER TDRR 20214			[illegible]	
C		REVISED PER TDRR 22254			[illegible]	
D		REVISED PER TDRR 23622			11-2-65	
E		REVISED PER TDRR 24253	RAJ		11-15-65	
F		REVISED PER TDRR 24492	RAJ		12-7-65	
G		REVISED PER TDRR 30691	JJB	JL	8-24-66	
H		REVISED PER TDRR 32003	REP	RW	11-28-66	
J		REVISED PER TDRR 32168	WRB	CP	12-10-66	

~~-131~~ ~~124~~	-121 123	-111 122	-101 121	-091 111	-081 110	-071 109	-061 20	-051 17	-041 12	-031 8	-021 7	-011 6	-000 5	EFFECTIVITY UNDEFINED G & N EFFECTIVITY	TITLE	REMARKS	FIND NO.
	ND1021039	ND1021039	ND1021039	ND1021039	ND1021039	ND1021039									AUXILIARY GROUND SUPPORT EQUIPMENT MANUAL		50
	ND1021038	ND1021038	ND1021038	ND1021038	ND1021038	ND1021038									PACKING, SHIPPING, & HANDLING MANUAL		49
							ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034		ASSOCIATED TEST EQUIPMENT CMRM		48
	ND1002326	ND1002326	1002324												ND POST INSTALLATION C/O SPEC. FOR G&N SYSTEM ~~S/C 14~~		47
	1002320														ND ACE-S/C DISPLAY & CONTROL FOR S/C 20 AT KSC		46
~~1009581~~	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
~~1009573~~	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
~~1009572~~	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
							1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
~~1009574~~	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
~~1009577~~	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
~~1009582~~	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
~~1009576~~	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
							1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
~~1009579~~	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
~~1009578~~	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST. DIAGRAM		35
~~1009515~~	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
~~1009575~~	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
~~1009549~~	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
~~1009550~~	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
~~1009516~~	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
~~1009513~~	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
~~1009512~~	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
							1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
														1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
														1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
~~1021041~~	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
							1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
							ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035		OPTICS INERTIAL TEST SET CMRM		17
										1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																	15
																	14
~~1009518~~	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
~~1009517~~	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
~~1009548~~	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
							1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
~~1009547~~	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
														1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																	7
~~1009580~~	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																	5
							1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
~~1009514~~	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																	2
~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING.

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED [illegible] 11-13-64
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE
SHEET OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15258				
B		REVISED PER TDRR 20914				
C		REVISED PER TDRR 22254				
D		REVISED PER TDRR 23622			11-2-65	
E		REVISED PER TDRR 24253	RAJ		11-15-65	
F		REVISED PER TDRR 24492	RAJ		12-7-65	
G		REVISED PER TDRR 30691	JJB		8-31-66	
H		REVISED PER TDRR 32003	RED	KWW	11-28-66	
J		REVISED PER TDRR 32168	WRB	CP	12-10-66	
K		REVISED PER TDRR 32285	LW		13 DEC 66	

			~~-131~~	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			~~124~~	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			
				1021040	1021040	1021040	1021040	1021040	1021040									BENCH MAINTENANCE GSE CMRM		51
				ND1021039	ND1021039	ND1021039	ND1021039	ND1021039	ND1021039									AUXILIARY GROUND SUPPORT EQUIPMENT MANUAL		50
				ND1021038	ND1021038	ND1021038	ND1021038	ND1021038	ND1021038									PACKING, SHIPPING, & HANDLING MANUAL		49
										ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034		ASSOCIATED TEST EQUIPMENT CMRM		48
				ND1002326	ND1002326	1002324												ND POST INSTALLATION C/O SPEC. FOR G&N SYSTEM ~~S/C 14~~		47
				1002320														ND ACE-S/C DISPLAY & CONTROL FOR S/C 20 AT KSC		46
			~~1009581~~	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			~~1009573~~	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			~~1009572~~	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			~~1009574~~	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			~~1009577~~	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			~~1009582~~	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			~~1009576~~	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			~~1009579~~	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
			~~1009578~~	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
			~~1009515~~	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			~~1009575~~	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM, ONE WIRE MECHANIZATION DRAWING		33
			~~1009549~~	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			~~1009550~~	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			~~1009516~~	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			~~1009513~~	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			~~1009512~~	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										1021001	1021001	1021001	1021001	1021001	1021001	1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		F T M FOR APOLLO G & N SYSTEM		25
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		A T P FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		A T P FOR APOLLO G & N OPTICS SUBSYSTEM		23
			~~1026000~~	1026000	1026000	1026000	1026000	1025000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		A T P PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			~~1021041~~	1021041	1021041	1021041	1021041	1021041	1021041	1021036	1021036	1021036	1021036	1021036	1021036	1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										1021067	1021067	1021067	1021067	1021067	1021067	1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
										ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035		OPTICS INERTIAL TEST SET CMRM		17
													1021069	1021069	1021069	1021069		MAP AND DATA VIEWER, CMRM		16
																				15
																				14
			~~1009518~~	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			~~1009517~~	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			~~1009548~~	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			~~1009547~~	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			~~1009580~~	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			~~1009514~~	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. 11-13-64
CHECKED 11-13-64
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1010999
SCALE
SHEET

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

14299

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15158			3/4/65	WK
B		REVISED PER TDRR 20914			7/20/65	WK
C		REVISED PER TDRR 22254			9/8/65	[illegible]
D		REVISED PER TDRR 23622			11-2-65	WK
E		REVISED PER TDRR 24253	RAJ		11-15-65	WK
F		REVISED PER TDRR 24492	RAJ		12-7-65	WK
G		REVISED PER TDRR 30691	JJB	JI	[illegible]	
H		REVISED PER TDRR 32003	REP	[illegible]	11-28-66	
J		REVISED PER TDRR 32168	W.R.B	CF	[illegible]	
K		REVISED PER TDRR 32285	LW		13 DEC 66	
L		REVISED PER TDRR 32355	[illegible]	[illegible]	22 DEC 66	

				ND1021040	ND1021040	ND1021040	ND1021040	ND1021040	ND1021040									BENCH MAINTENANCE GSE CMRM		51
				ND1021039	ND1021039	ND1021039	ND1021039	ND1021039	ND1021039									AUXILIARY GROUND SUPPORT EQUIPMENT MANUAL		50
				ND1021038	ND1021038	ND1021038	ND1021038	ND1021038	ND1021038									PACKING, SHIPPING, & HANDLING MANUAL		49
										ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034	ND1021034		ASSOCIATED TEST EQUIPMENT CMRM		48
				ND1002326	ND1002326	ND1002324												ND POST INSTALLATION C/O SPEC. FOR G&N SYSTEM ~~S/C 14~~		47
				ND1002320														ND ACE-S/C DISPLAY & CONTROL FOR S/C 20 AT KSC		46
			~~1009581~~	1009581	1009581	1009581	1009581	1009581	1009581	1010075			1010075	1010075	1010075	1010075		APOLLO G & N STRUCTURE GROUNDS DIAGRAM		45
			~~1009573~~	1009573	1009573	1009573	1009573	1009573	1009573	1010076		1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		44
			~~1009572~~	1009572	1009572	1009572	1009572	1009572	1009572	1010077			1010077	1010077	1010077	1010077		APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		43
										1010078			1010078	1010078	1010078	1010078		APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION DIAGRAM		42
			~~1009574~~	1009574	1009574	1009574	1009574	1009574	1009574	1010079			1010079	1010079	1010079	1010079		APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST. DIAGRAM		41
			~~1009577~~	1009577	1009577	1009577	1009577	1009577	1009577	1010080			1010080	1010080	1010080	1010080		APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION DIAGRAM		40
			~~1009582~~	1009582	1009582	1009582	1009582	1009582	1009582	1010081			1010081	1010081	1010081	1010081		APOLLO G & N 400 CPS POWER DISTRIBUTION DIAGRAM		39
			~~1009576~~	1009576	1009576	1009576	1009576	1009576	1009576	1010082			1010082	1010082	1010082	1010082		APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION DIAGRAM		38
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTION DIAGRAM		37
			~~1009579~~	1009579	1009579	1009579	1009579	1009579	1009579	1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIBUTION DIAGRAM		36
			~~1009578~~	1009578	1009578	1009578	1009578	1009578	1009578	1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DIST DIAGRAM		35
			~~1009515~~	1009515	1009515	1009515	1009515	1009515	1009515	1010137	1010194	1010194	1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE DIAGRAM		34
			~~1009575~~	1009575	1009575	1009575	1009575	1009575	1009575	1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING		33
			~~1009549~~	1009549	1009549	1009549	1009549	1009549	1009549	1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS		32
			~~1009550~~	1009550	1009550	1009550	1009550	1009550	1009550	1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS		31
			~~1009516~~	1009516	1009516	1009516	1009516	1009516	1009516	1010135	1010192	1010192	1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE WIRING DIAGRAM		30
			~~1009513~~	1009513	1009513	1009513	1009513	1009513	1009513	1010136	1010193	1010193	1010136	1010136	1010136	1010136		ZERO OPTICS MODE WIRING DIAGRAM		29
			~~1009512~~	1009512	1009512	1009512	1009512	1009512	1009512									TWO WIRE MECH OPTICS		28
										ND1021001	ND1021001	ND1021001	ND1021001	ND1021001	ND1021001	ND1021001		APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	NOTE 2	27
																	ND1002218	APOLLO G & N SYSTEM POST INSTALLATION CHECKOUT		26
			~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		FTM FOR APOLLO G & N SYSTEM		25
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ATP FOR APOLLO G & N INERTIAL SUBSYSTEM		24
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		ATP FOR APOLLO G & N OPTICS SUBSYSTEM		23
			~~1026000~~	1026000	1026000	1026000	1026000	1026000	1026000	1015000	1025500	1025500	1015000	1015000	1015000	1015000		ATP PRE-INSTALLATION FOR APOLLO G & N SYSTEM		22
			~~1015497~~	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497	1015497		ISS ASSEMBLY CONFIGURATION		21
																	ND 1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL		20
			~~1021041~~	1021041	1021041	1021041	1021041	1021041	1021041	ND1021036	ND1021036	ND1021036	ND1021036	ND1021036	ND1021036	ND1021036		GUIDANCE AND NAVIGATION SYSTEM, CMRM		19
										ND1021067	ND1021067	ND1021067	ND1021067	ND1021067	ND1021067	ND1021067		OPTICAL UNIT SYSTEM, CMRM	NOTE 2	18
										ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035	ND1021035		OPTICS INERTIAL TEST SET CMRM		17
													ND1021069	ND1021069	ND1021069	ND1021069		MAP AND DATA VIEWER, CMRM		16
																				15
																				14
			~~1009518~~	1009518	1009518	1009518	1009518	1009518	1009518									TRACKER MODE		13
			~~1009517~~	1009517	1009517	1009517	1009517	1009517	1009517	1010139	1010196	1010196	1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION DIAGRAM		12
			~~1009548~~	1009548	1009548	1009548	1009548	1009548	1009548								1010038	IMU/CDU FUNCTIONAL DIAGRAM		11
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN PHASING AND NORMALIZING DIAGRAM		10
			~~1009547~~	1009547	1009547	1009547	1009547	1009547	1009547	1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM		9
																	1014616	INSTALLATION LAYOUT OF G & N INTERCONNECT HARNESS TO S/C		8
																				7
			~~1009580~~	1009580	1009580	1009580	1009580	1009580	1009580	1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM 2 WIRE MECH. DRAWING		6
																				5
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC		4
			~~1009514~~	1009514	1009514	1009514	1009514	1009514	1009514	1010138	1010195	1010195	1010138	1010138	1010138	1010138		SHAFT MANUAL MODE SCHEMATIC		3
																				2
			~~1009502~~	1009502	1009502	1009502	1009502	1009502	1009502	1015100	1010191	1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM		1
			~~-131~~	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	EFFECTIVITY UNDEFINED	TITLE	REMARKS	FIND NO.
			~~124~~	123	122	121	111	110	109	20	17	12	8	7	6	5	G & N EFFECTIVITY			

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY
2. OPTICAL UNIT SYSTEM & AGC SUB-SYSTEM INFORMATION CONTAINED IN 1021041 FOR 100 SERIES.
3. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
ND 1000000	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN U.V. [illegible] 11-13-64
CHECKED [illegible] 11-13-64
APPROVED
APPROVED W[illegible]
APPROVED MIT W Kupfer 13 Mar
APPROVED MSC W J [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOCUMENT LIST
BLOCK I

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 1019999
SCALE —
SHEET 1 OF 1

1019999

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14299					
SYM	ZONE	DESCRIPTION	DR	CHK	DATE APPROVED

G & N SYSTEM CONFIGURATION DASH NO.																			
-161	-151	-141	-131	-121	-111	-101	-091	-081	-071	-061	-051	-041	-031	-021	-011	-000	DOCUMENT NUMBER	TITLE	REMARKS
																	1010075	APOLLO G & N STRUCTURE GROUNDS	
												1010076	1010076	1010076	1010076	1010076		APOLLO OPTICAL SUBSYSTEM OV DC POWER DISTRIBUTION	
																	1010077	APOLLO OPTICAL SUBSYSTEM +28 VDC POWER DISTRIBUTION	
																	1010078	APOLLO OPTICAL SUBSYSTEM 25.6 KC/S POWER DISTRIBUTION	
																	1010079	APOLLO OPTICAL SUBSYSTEM 28V 1%, 28V 5% 800CPS POWER DIST	
																	1010080	APOLLO INERTIAL SUBSYSTEM OV DC POWER DISTRIBUTION	
																	1010081	APOLLO G & N 400 CPS POWER DISTRIBUTION	
																	1010082	APOLLO INERTIAL SUBSYSTEM +28 VDC POWER DISTRIBUTION	
										1010083			1010083	1010083	1010083	1010083		APOLLO INERTIAL SUBSYSTEM 3200 CPS, 25.6 KC POWER DISTRIBUTI	
										1010084			1010084	1010084	1010084	1010084		APOLLO INERTIAL SUBSYSTEM -28, +12, +32, +120 VDC POWER DISTRIB ON	
										1010085			1010085	1010085	1010085	1010085		APOLLO INERTIAL SUBSYSTEM 28V 1%, 28V 5% 800 CPS POWER DI	
										1010137			1010137	1010137	1010137	1010137		TRUNNION MANUAL MODE	
										1015560			1015560	1015560	1015560	1015560		APOLLO INERTIAL SUBSYSTEM ONE WIRE MECHANIZATION DRAWING	
										1015561			1015561	1015561	1015561	1015561		TWO WIRE MECHANIZATION DRAWING OF PIPA LOOPS	
										1015562			1015562	1015562	1015562	1015562		TWO WIRE MECHANIZATION DRAWING OF STABILIZATION LOOPS	
										1010135			1010135	1010135	1010135	1010135		SEXTANT OPTICS RESOLVED MODE	
										1010136			1010136	1010136	1010136	1010136		ZERO OPTICS MODE	
																	1021000	APOLLO GUIDANCE COMPUTER TEST SET, CMRM	
																	1021001	APOLLO GUIDANCE COMPUTER SUBSYSTEM, CMRM	
																	1021002	APOLLO GUIDANCE COMPUTER CALIBRATION SYS, CMRM	
																	1021003	APOLLO GUIDANCE COMPUTER SIMULATOR, CMRM	
																	1021005	APOLLO GUIDANCE COMPUTER TEST SET CONNECTOR MANUAL	
																	1021006	APOLLO GUIDANCE COMPUTER STU, CMRM	
																	1021034	ASSOCIATED TEST EQUIPMENT, CMRM	
																	1021035	OPTICS INERTIAL TEST SET	
																	1021037	GUIDANCE AND NAVIGATION SYSTEM EQUIP. FAMILIARIZATION MANUAL	
																	1021036	GUIDANCE AND NAVIGATION SYSTEM, CMRM	
																	1021067	OPTICAL UNIT SYSTEM, CMRM	
										1021066			1021066	1021066	1021066	1021066		MISCELLANEOUS OPTICS SUBSYSTEM TEST EQUIPMENT, CMRM	
																	1021069	MAP AND DATA VIEWER, CMRM	
																	1021068	FUNCTIONAL TESTER, CMRM	
																	1021070	PREC TEST FIXTURE, CMRM	
																	1021071	MAP AND DATA VIEWER TESTER, CMRM	
										1010139			1010139	1010139	1010139	1010139		OPTICAL SUBSYSTEM POWER DISTRIBUTION	
																	1010038	IMU/CDU FUNCTIONAL DIAGRAM	
										1000299			1000299	1000299	1000299	1000299		SINGLE SPEED RESOLVER CHAIN	
										1010037			1010037	1010037	1010037	1010037		IMU/CDU MODING MECHANIZATION DIAGRAM	
																	1014616	LAYOUT D & C HARNESS INSTALLATION	
										1017510			1017510	1017510	1017510	1017510		IMU TEMPERATURE CONTROL SYSTEM	
										1014999			1014999	1014999	1014999	1014999		INSTALLATION LIST APOLLO GUIDANCE EQUIPMENT	
										1010039			1010039	1010039	1010039	1010039		IMU TEMPERATURE CONTROL SYSTEM SCHEMATIC	
										1010138			1010138	1010138	1010138	1010138		SHAFT MANUAL MODE	
									1009502	1015100		1010191	1015100	1015100	1015100	1015100		FUNCTIONAL DIAGRAM OPTICS SUBSYSTEM	

NOTES:

1. THIS DRAWING FOR REFERENCE ONLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

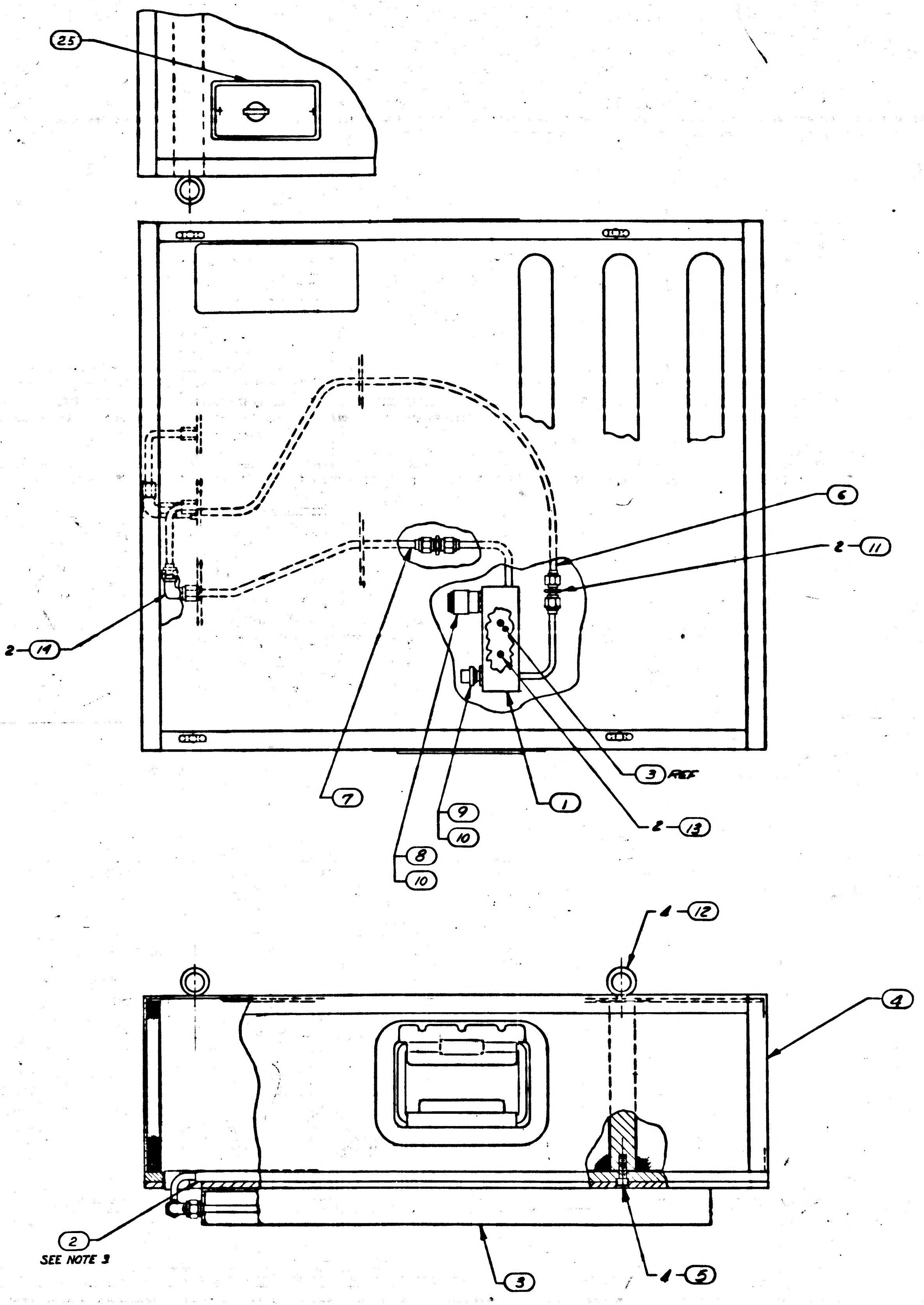
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N COMMAND MODULE
SUPPORTING DOC. LIST

CODE IDENT NO.
SIZE E
DRAWING NO. 1019999
SCALE
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO.		
A	CHANGED PER TDRP 06768 DR J.P. Leonard CHKY [illegible] APPD SV [illegible]	11 MAR 64	[illegible]



NOTES:
1. ASSEMBLE FIND NO. 18 USING FIND NO. 23
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
3. PURGE & FILL FIND NO. 2 PER ND1002212 WITH FLUID PER 1001431
4. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
5. FIND NO. 2 IS GOVERNMENT FURNISHED MATERIAL
6. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1014398

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04307 DATE 10/30/62

SEE NOTE 4

SEE NOTE 5

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1014398	INTERFACE CONTROL DOC	REF
1	1020108	PLATE, ACCESS	25
~~[illegible]~~	~~MS35[illegible]-62~~	~~SCREW, MCH, PAN HD, SLOTTED~~	24
~~[illegible]~~	~~MIL-S-40083-C131~~	~~SEALING COMPOUND~~	23
~~10~~	~~MS21044-C3~~	~~NUT, SELF LOCKING~~	22
~~[illegible]~~	~~MS15795-808~~	~~WASHER, PLAIN FLAT~~	21
~~[illegible]~~	~~MS35207-60~~	~~SCREW, MCH, FLAT CSK HD~~	20
~~[illegible]~~	~~MS35201-[illegible]~~	~~SCREW, MCH, FLAT CSK HD~~	19
~~8~~	~~MS35234-80~~	~~SCREW, MCH, PAN HD, SLOTTED~~	18
~~4~~	~~1006472~~	~~BRACKET~~	17
~~1~~		~~END CONNECTOR ASSY~~	16
~~1~~	~~1003180~~	~~TOE PLATE~~	15
2	AN821-4D	ELBOW	14
2	MS35200-55	SCREW, MACH FLAT CSK HD	13
4	1006674-1	SCREW, EYE	12
2	AN815-4D	UNION	11
2	MS28778-4	PACKING, PREFORMED	10
1	1000135	COUPLING-HALF, MALE	9
1	1006659-1	COUPLING-HALF, FEMALE	8
1	1020067-1	HOSE, HYDRAULIC	7
1	1020067-2	HOSE, HYDRAULIC	6
4	MS16995-65	SCREW, CAP SOC HD	5
1	1014399	COVER, THRM INSULATOR	4
1	1014392	BASE, HANDLING FIXTURE	3
1	1015422	COLD PLATE ASSY	2
1	1014493	MANIFOLD & TUBE ASSY	1

LIST OF MATERIALS

1020107
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN J.S. Byer DATE 3 SEP 62
CHECKED W.J. Gifford 4 OCT 62
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

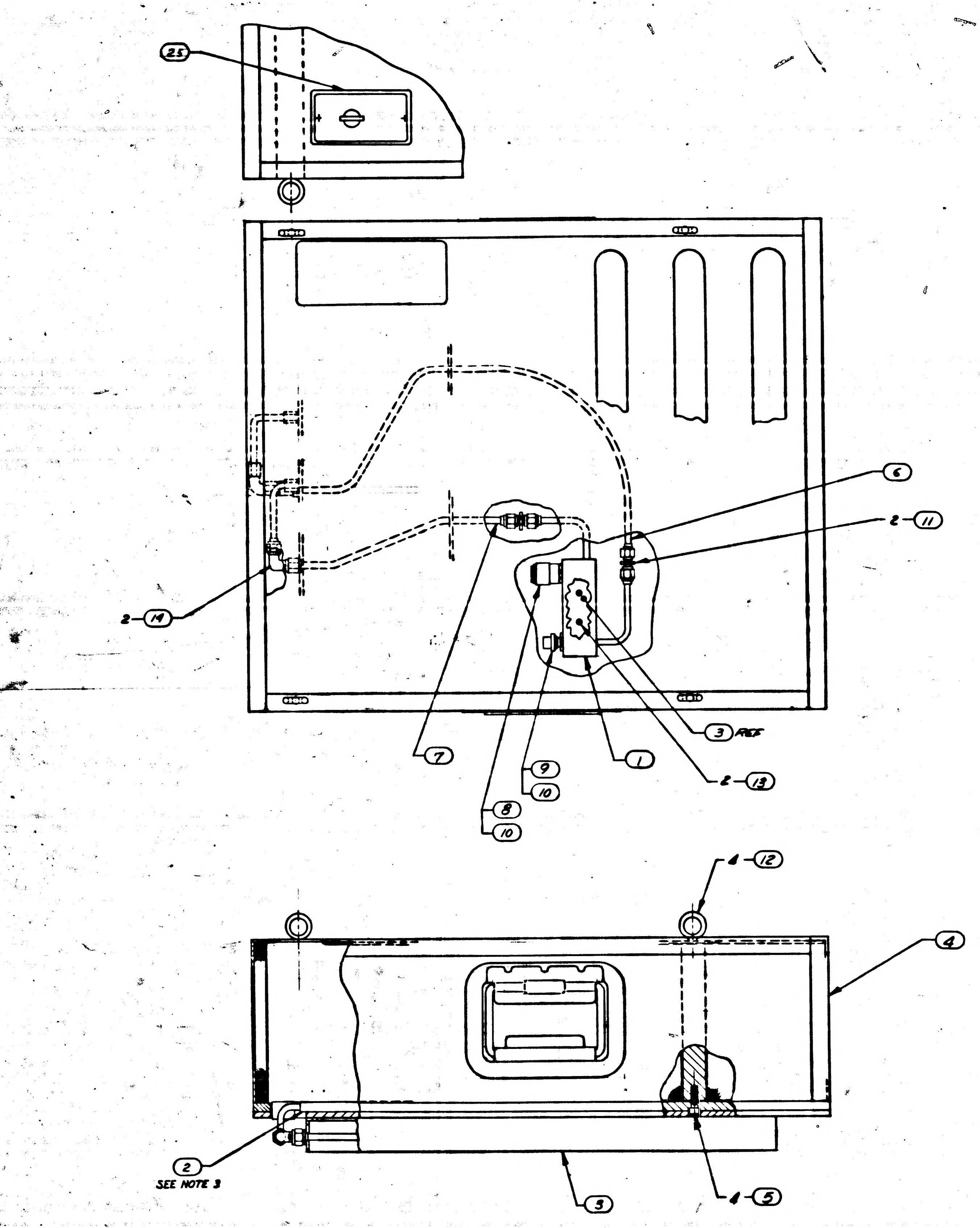
HANDLING FIXTURE, AGC COMPUTER

CODE IDENT NO —
SIZE J
DRAWING NO. 1020001
SCALE 1/2
SHEET 1 OF 1

MASTER

1020001

SYM	DESCRIPTION	DATE	APPROVED
—	~~C. B. RELEASED PER TDRR NO.~~		
A	CHANGED PER TDRR 06768 DR J.P. Leonard CHK W. Wellman APPD SV	4 MAR 64	KCB
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. G.G.C. APPD	15 MAY 64	KCB



NOTES:

1. ASSEMBLE FIND NO. 18 USING FIND NO. 23
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
3. PURGE & FILL FIND NO. 2 PER ND 1002212 WITH FLUID PER 1001491
4. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
5. FIND NO. 2 IS GOVERNMENT FURNISHED MATERIAL
6. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1014398

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04307 DATE 10/30/62

SEE NOTE 4

SEE NOTE 5

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1014398	INTERFACE CONTROL DOC	REF
1	1020108	PLATE, ACCESS	25
~~[illegible]~~	~~[illegible]~~	~~SCREW, MACH, PAN HD, SLOTTED~~	~~24~~
~~AR~~	~~MIL-S-[illegible]~~	~~SEALING COMPOUND~~	~~23~~
~~10~~	~~MS 21044-C3~~	~~NUT, SELF LOCKING~~	~~22~~
~~[illegible]~~	~~MS15795-808~~	~~WASHER, FLAT~~	~~21~~
~~10~~	~~MS35207-[illegible]~~	~~SCREW, MACH, FLAT CSK HD~~	~~20~~
~~[illegible]~~	~~[illegible]~~	~~SCREW, MACH, FLAT CSK HD~~	~~19~~
~~6~~	~~[illegible]~~	~~SCREW, MACH, PAN HD, SLOTTED~~	~~18~~
~~4~~	~~[illegible]~~	~~BRACKET~~	~~17~~
~~[illegible]~~		~~[illegible]~~	~~16~~
~~1~~	~~1003180~~	~~TOE PLATE~~	~~15~~
2	AN821-4D	ELBOW	14
2	MS35200-72	SCREW, MACH FLAT CSK HD	13
4	1006674-1	SCREW, EYE	12
2	AN815-4D	UNION	11
2	MS 28778-4	PACKING, PREFORMED	10
1	1000135	COUPLING-HALF, MALE	9
1	1006659-1	COUPLING-HALF, FEMALE	8
1	1020067-1	HOSE, HYDRAULIC	7
1	1020067-2	HOSE, HYDRAULIC	6
4	MS16995-65	SCREW, CAP SOC HD	5
1	1014399	COVER, HANDLING FIXTURE	4
1	1014392	BASE, HANDLING FIXTURE	3
1	1015922	COLD PLATE ASSY	2
1	1014493	MANIFOLD & TUBE ASSY	1

LIST OF MATERIALS

1020107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-497

DRAWN J.S. Byers DATE
CHECKED W.J. Gifford 4 OCT 62
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

HANDLING FIXTURE
AGC COMPUTER

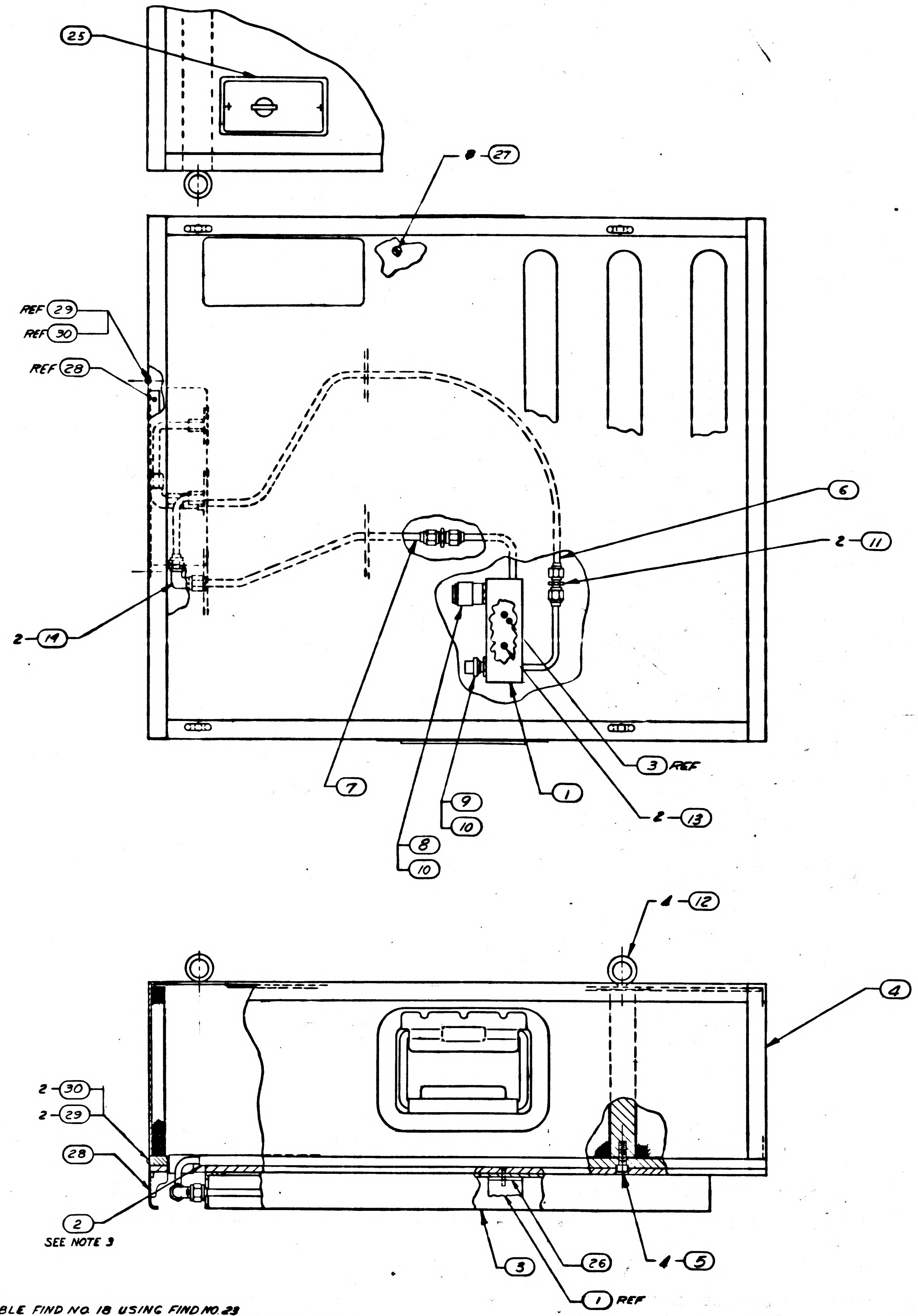
1020001

SCALE 1/2

MASTER

1020001

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO.		
A	CHANGED PER TDRR 06768 DR J.P. Leonard CHK APPD	11 MAR 64	KCB
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. Q.G.C. APPD	12 MAY 64	KCB
C	CHANGED PER TDRR 09779 DR CHK APPD	16 Jun 64	KCB



NOTES:

1. ASSEMBLE FIND NO. 18 USING FIND NO. 23
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
3. PURGE & FILL FIND NO. 2 PER ND1002212 WITH FLUID PER 1001491
4. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
5. FIND NO. 2 IS GOVERNMENT FURNISHED MATERIAL
6. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1014398

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

SEE NOTE 4 (FIND NO. REF); SEE NOTE 5 (FIND NO. 2)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS15795-807	WASHER, FLAT	30
2	MS35233-27	SCREW, PAN HD	29
1	1020196	COVER, TUBING	28
8	MS35200-56	SCREW, MACH, FLAT CSK HD	27
1	1020197	PLATE, SPACER	26
☒	1014398	INTERFACE CONTROL DOC	REF
1	1020108	PLATE, ACCESS	25
~~[illegible]~~	~~[illegible]~~	~~SCREW, MCH, PAN HD, SLOTTED~~	~~24~~
~~AR~~	~~[illegible]~~	~~SEALING COMPOUND~~	~~23~~
~~10~~	~~MS 21042-C3~~	~~NUT, SELF LOCKING~~	~~22~~
~~[illegible]~~	~~[illegible]~~	~~WASHER, PLAIN FLAT~~	~~21~~
~~[illegible]~~	~~[illegible]~~	~~SCREW, MCH, FLAT CSK HD~~	~~20~~
~~[illegible]~~	~~[illegible]~~	~~SCREW, MCH, FLAT CSK HD~~	~~19~~
~~8~~	~~[illegible]~~	~~SCREW, MCH, PAN HD, SLOTTED~~	~~18~~
~~[illegible]~~	~~[illegible]~~	~~BRACKET~~	~~17~~
~~1~~		~~END CONNECTOR ASSY~~	~~16~~
~~1~~	~~1003180~~	~~TOE PLATE~~	~~15~~
2	AN821-4D	ELBOW	14
2	MS35200-72	SCREW, MACH FLAT CSK HD	13
4	1006674-1	SCREW, EYE	12
2	AN815-4D	UNION	11
2	MS 28778-4	PACKING, PREFORMED	10
1	1000135	COUPLING-HALF, MALE	9
1	1006659-1	COUPLING-HALF, FEMALE	8
1	1020067-1	HOSE, HYDRAULIC	7
1	1020067-2	HOSE, HYDRAULIC	6
4	MS16995-65	SCREW, CAP SOC HD	5
1	1014399	COVER, THRM INSULATOR	4
1	1014392	BASE, HANDLING FIXTURE	3
1	1015422	COLD PLATE ASSY	2
~~1~~	~~1014493~~	~~MANIFOLD & TUBE ASSY~~	~~1~~

LIST OF MATERIALS

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN J.S. DATE 3 SEP 63
CHECKED W.F. Gifford 4 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

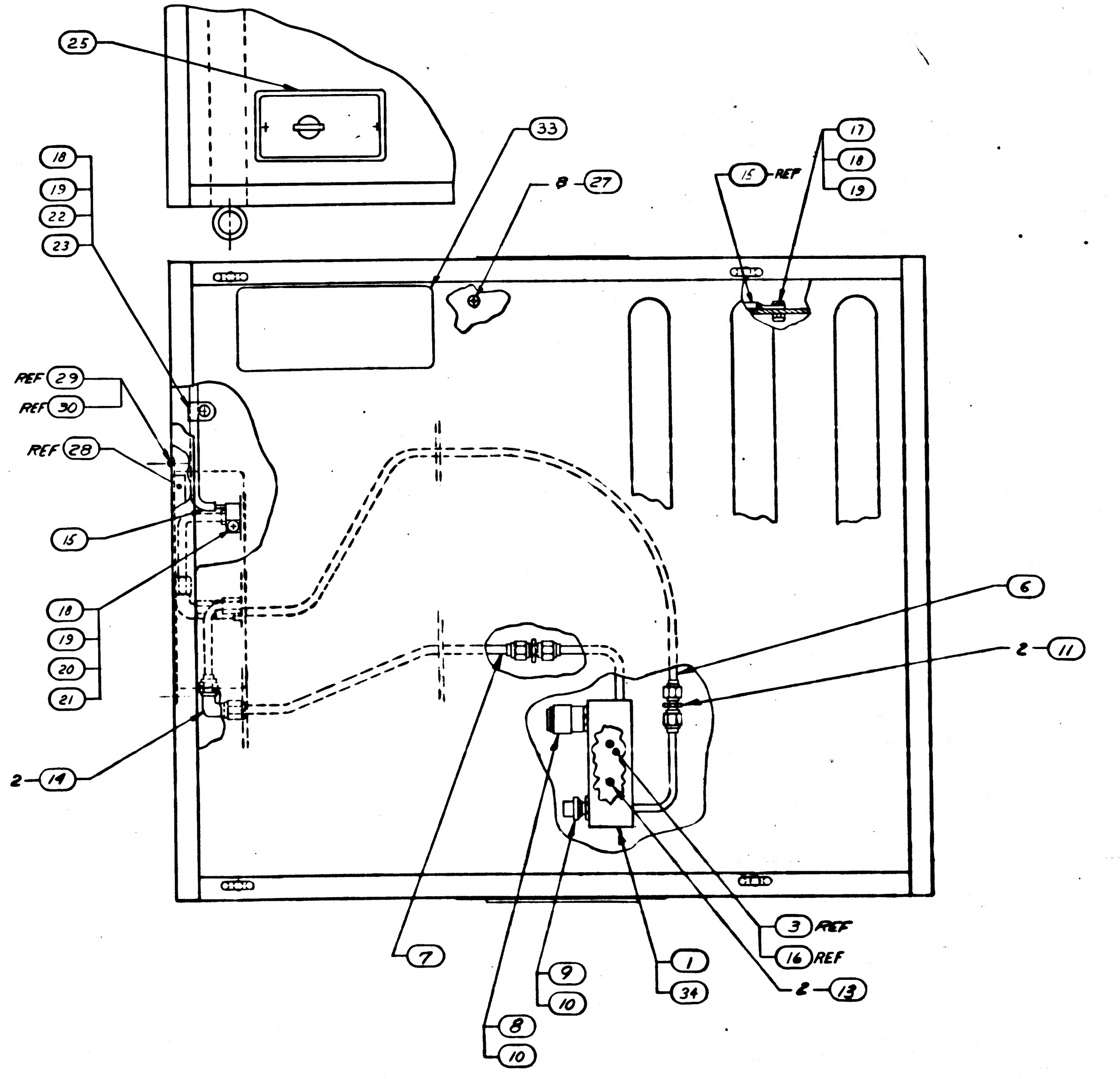
HANDLING FIXTURE,
AGC COMPUTER

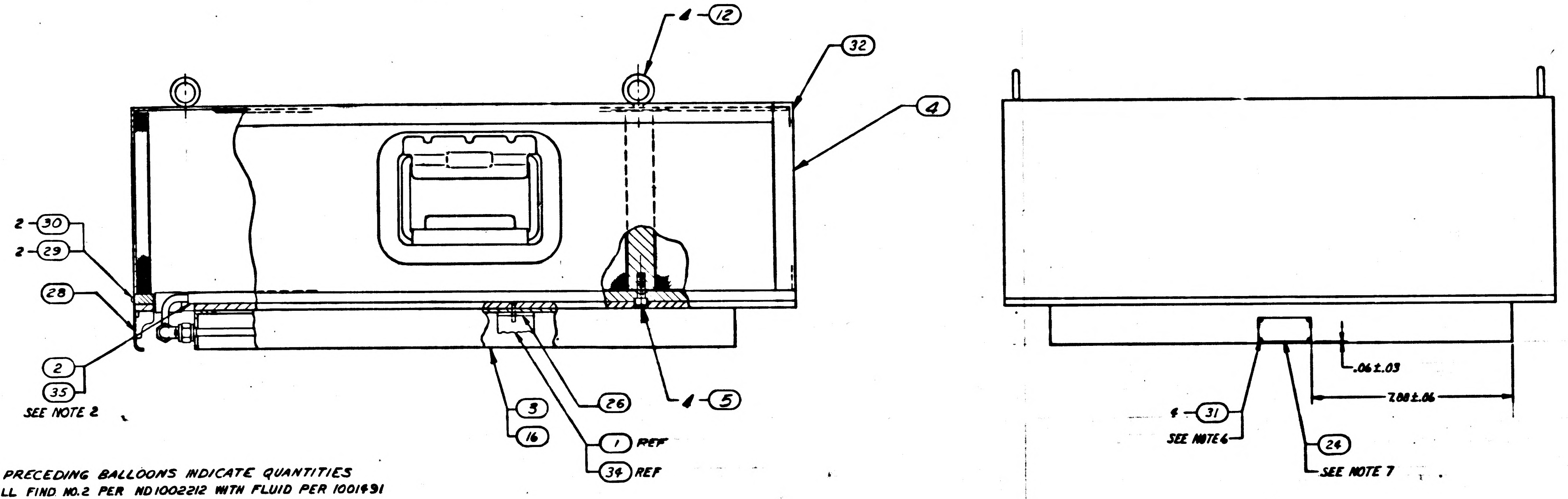
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020001
SCALE 1/2
WT
SHEET 1 OF 1

1020001

1020001

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO.		
A	CHANGED PER TDRR 0 68 DR J.P. Leonard CHK APPD	11 MAR 64	
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. Q.G.C. APPD	18 MAY 64	
C	CHANGED PER TDRR 09779 DR CHK APPD	30 Jun 64	
D	CHANGED PER TDRR 12926 DR J.P. Leonard CHK APPD	14 OCT 64	





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04707 DATE 10/30/63

NOTES.
1. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
2. PURGE & FILL FIND NO. 2 PER ND1002212 WITH FLUID PER 1001491
3. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
4. FIND NUMBERS 2 & 35 ARE GOVERNMENT FURNISHED MATERIAL
5. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1014398
6. USING FIND NO. 24 AS A TEMPLATE DRILL 4 HOLES $^{.067}_{.070}$ DIA
7. MARK APPLICABLE INFORMATION .06 HIGH PER ND1002019 & ND1002023

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO	
☒	☒	1020107	INSTALLATION OF AGC TO HAND. FIX.	REF	
1	—	1021521	COLD PLATE ASSY	35	
1	—	1020233	MANIFOLD & TUBE ASSY	34	
1	1	1006241	PLUG, PROTECTIVE PLASTIC	33	
1	1	1006240	CAP, PROTECTIVE PLASTIC	32	
4	4	MS20470A2-4	RIVET, SOLID UNIVERSAL HEAD	31	
2	2	MS15795-807	WASHER, FLAT	30	
2	2	MS35233-27	SCREW, PAN HD	29	
1	1	1020196	COVER, TUBING	28	
8	8	MS35216-55	SCREW, MACH, PAN HD CROSS RECESSED	27	
1	1	1020197	PLATE, SPACER	26	
☒	☒	1014398	INTERFACE CONTROL DOC	REF	SEE NOTE 3
1	1	1020108	PLATE, ACCESS	25	
1	1	1020085	PLATE IDENTIFICATION	24	
1	—	MS35234-65	SCREW, MACH PAN HD	23	
1	—	MS35140-2	STRAP, RETAINING	22	
1	—	MS35234-62	SCREW, MACH PAN HD	21	
1	—	MS935306	CLAMP, LOOP	20	
3	—	MS21044C3	NUT, SELF-LOCKING	19	
3	—	MS15795-808	WASHER, PLAIN	18	
1	—	MS35234-64	SCREW, MACH PAN HD	17	
1	—	1020297	PLATFORM ASSY HAND. FIXTURE	16	
1	—	1020276	GROUND STRAP ASSY	15	
2	2	AN821-4D	ELBOW	14	
2	2	MS35200-72	SCREW, MACH FLAT CSK HD	13	
4	4	100667-1	SCREW, EYE	12	
2	2	AN815-4D	UNION	11	
2	2	MS28778-4	PACKING, PREFORMED	10	
1	1	1000135	COUPLING-HALF, MALE	9	
1	1	1006659-1	COUPLING-HALF, FEMALE	8	
1	1	1020067-1	HOSE, HYDRAULIC	7	
1	1	1020067-2	HOSE, HYDRAULIC	6	
4	4	MS16995-65	SCREW, CAP SOC HD	5	
1	1	1014399	COVER, THRM INSULATOR	4	
—	1	1014392	PLATFORM ASSY HANDLING FIXTURE	3	
—	1	1015422	COLD PLATE ASSY	2	SEE NOTE 4
—	1	1014493	MANIFOLD & TUBE ASSY	1	
-2	-1	LIST OF MATERIALS			

1020107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J.S. Byer DATE 30 SEP 63
CHECKED W.J. Gifford 4 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HANDLING FIXTURE,
AGC

CODE IDENT NO —
SIZE J
DRAWING NO 1020001
SCALE 1/2 WT
SHEET 1 OF 1

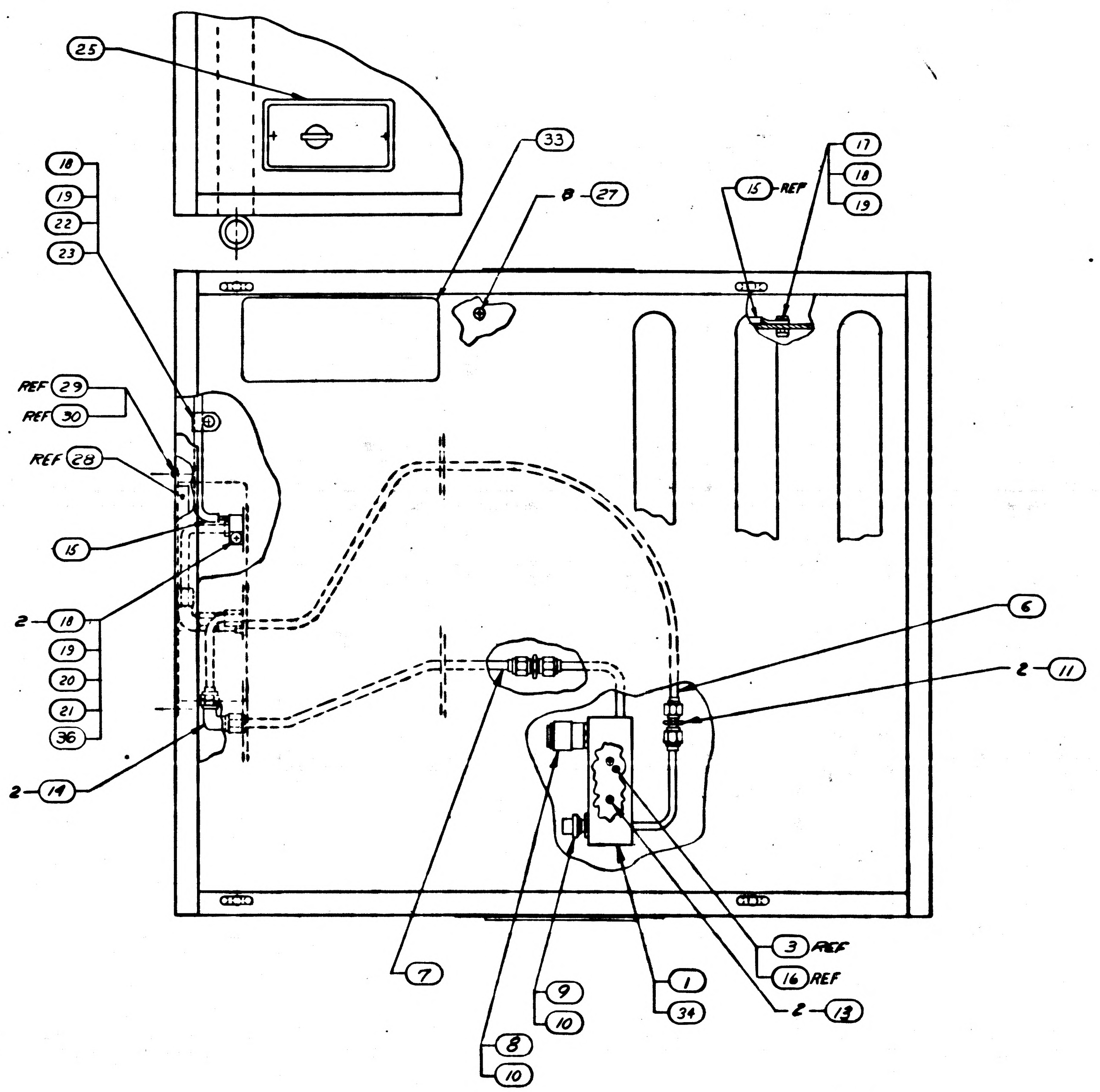
1020001

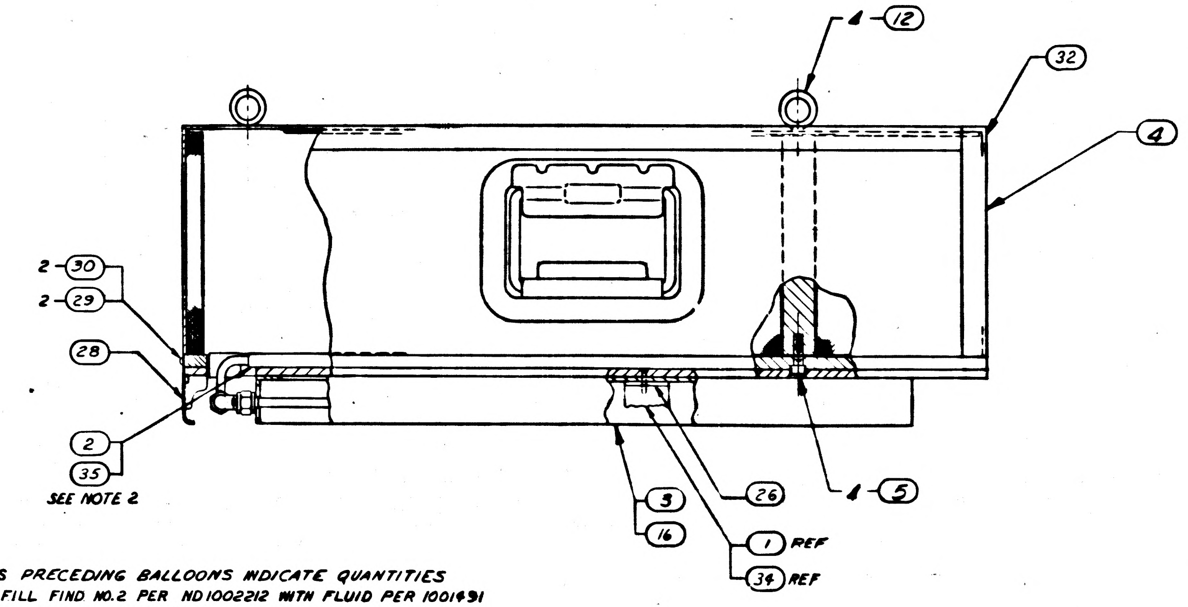
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

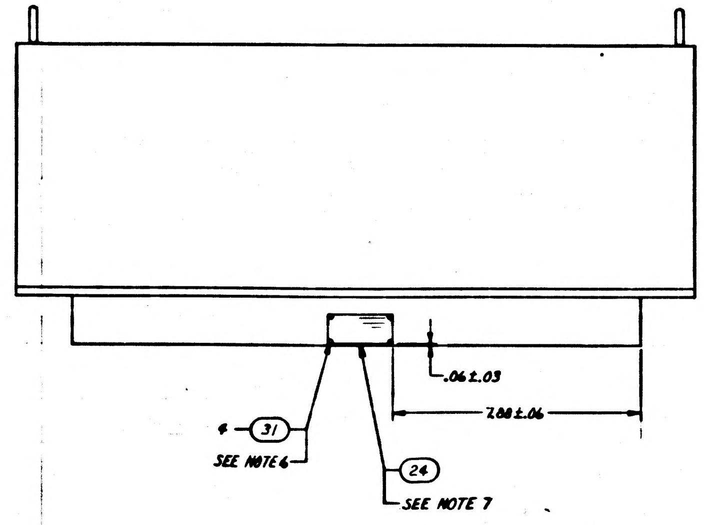
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO [illegible]

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	~~CL B RELEASED PER TDRR NO.~~		
A	CHANGED PER TDRR 06768 DR J.P. Leonard CHK APPD	11 MAR 64	KCB
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. Q.G.C. APPD	18 MAY 64	KCB
C	CHANGED PER TDRR 09779 DR CHK APPD	16 JUN 64	KCB
D	CHANGED PER TDRR 12926 DR J.P. Leonard CHK APPD	14 OCT 64	KCB
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 14860 DR. CHK APPD	6 JAN 65	KCB







	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	NO
NOT SHOWN	✕	✕	1020339	MOUNTING KIT (BLOCK I)	RE
NOT SHOWN	✕	✕	1020338	MOUNTING KIT (BLOCK IF)	R
	1	–	MS35335-60	WASHER, LOCK FLAT-EXTERNAL TOOTH	3
SEE NOTE 9	✕	✕	1020224	INSTALLATION OF AGC TO HAND FIX.	RE
SEE NOTE 8	✕	✕	1020107	INSTALLATION OF AGC TO HAND. FIX.	RE
	1	–	1021521	COLD PLATE ASSY	3
	1	–	1020233	MANIFOLD & TUBE ASSY	3
	1	1	1006241	PLUG, PROTECTIVE PLASTIC	3
	1	1	1006240	CAP, PROTECTIVE PLASTIC	3
	4	4	MS20470A2-4	RIVET, SOLID UNIVERSAL HEAD	3
	2	2	MS15795-807	WASHER, FLAT	3
	2	2	MS35233-42	SCREW, PAN HD	2
	1	1	1020196	COVER, TUBING	2
	8	8	MS35216-55	SCREW, MACH, PAN HD CROSS RECESSED	2
	1	1	1020197	PLATE, SPACER	2
SEE NOTE 3	✕	✕	1014398	INTERFACE CONTROL DOC	RE
	1	1	1020108	PLATE, ACCESS	2
	1	1	1020085	PLATE IDENTIFICATION	2
	1	–	MS35234-65	SCREW, MACH PAN HD	2
	1	–	MS21919-DG2	STRAP, RETAINING	2
	1	–	MS35234-64	SCREW, MACH PAN HD	2
	1	–	SEE NOTE 10	CLAMP, LOOP	2
	3	–	MS21044C3	NUT, SELF-LOCKING	1
	4	–	MS15795-808	WASHER, PLAIN	1
	1	–	MS35234-64	SCREW, MACH PAN HD	1
	1	–	1020297	PLATFORM ASSY HAND. FIXTURE	1
	1	–	1020276	GROUND STRAP ASSY	1
	2	2	AN821-4D	ELBOW	1
	2	2	MS35200-72	SCREW, MACH FLAT CSK HD	1
	4	4	1006674-1	SCREW, EYE	1
	2	2	AN815-4D	UNION	1
	2	2	MS28778-4	PACKING, PREFORMED	1
	1	1	1000135	COUPLING-HALF, MALE	[illegible]
	1	1	1006659-1	COUPLING-HALF, FEMALE	[illegible]
	1	1	1020067-1	HOSE, HYDRAULIC	[illegible]
	1	1	1020067-2	HOSE, HYDRAULIC	[illegible]
	4	4	MS16995-65	SCREW, CAP SOC HD	[illegible]
	1	1	1014399	COVER, THERM INSULATOR	4
SEE NOTE 4	–	1	1014392	PLATFORM ASSY HANDLING FIXTURE	[illegible]
	–	1	1015422	COLD PLATE ASSY	2
	–	1	1014493	MANIFOLD & TUBE ASSY	[illegible]

LIST OF MATERIALS

NOTES.

1. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
2. PURGE & FILL FIND NO.2 PER ND1002212 WITH FLUID PER 1001491
3. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
4. FIND NUMBERS 2 & 35 ARE GOVERNMENT FURNISHED MATERIAL
5. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1014398
6. USING FIND NO. 24 AS A TEMPLATE DRILL 4 HOLES $^{.067}_{.070}$ DIA
7. MARK APPLICABLE INFORMATION .06 HIGH PER ND1002019 & ND1002023
8. INSTALLATION OF BLOCK I AGC.
9. INSTALLATION OF BLOCK IF (100 SERIES) AGC.
10. SELECT FIND NO 20 FROM MS9353-03 THRU 05. CORRECT SIZE TO BE DETERMINED BY TUBING OD.
11. ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DWG NO. & A-1 SUFFIX.

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

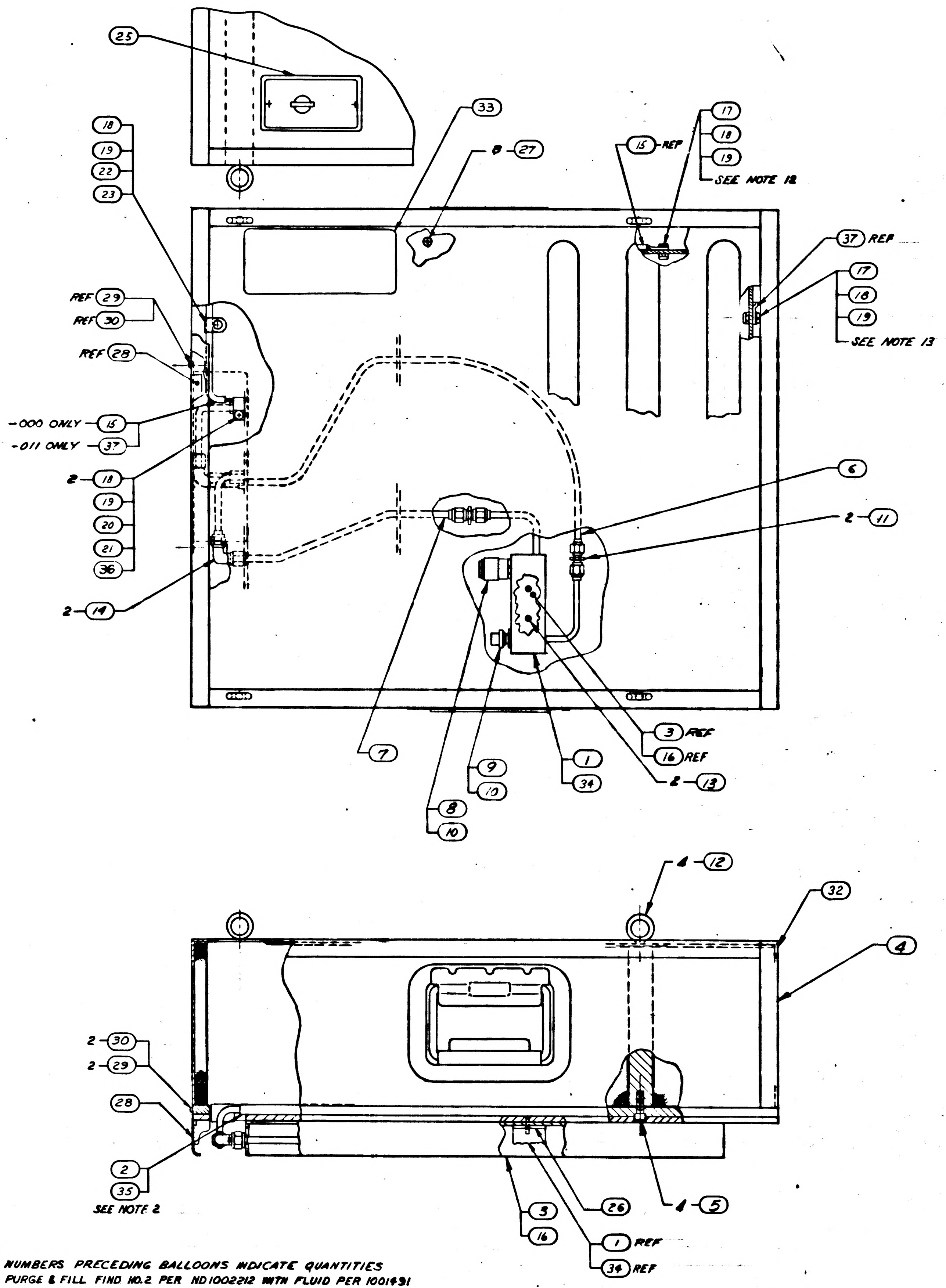
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J.S. DATE 3 SEP
CHECKED W.J. Gifford 4 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HANDLING FIXTURE,
AGC

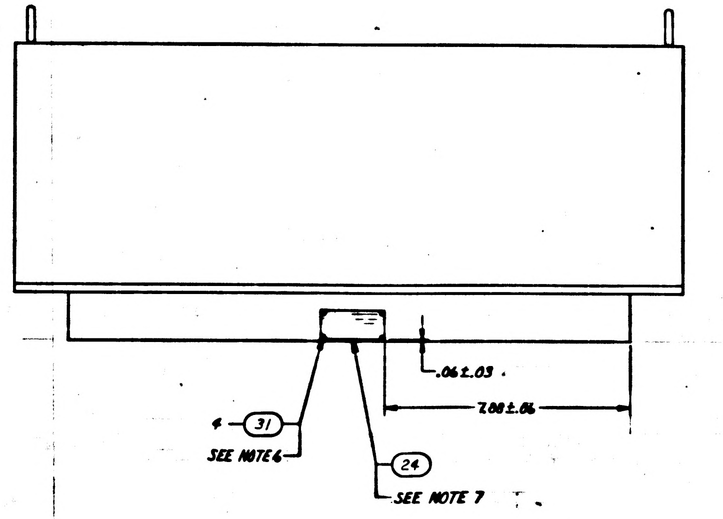
CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020001
SCALE 1/2
WT
SHEET 1 OF

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO.0[illegible]		
A	CHANGED PER TDRR 06768 DR J.P. Leonard CHK J. Waltz APPD S.V.	11 MAR 64	
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. Q.G.C. APPD G. Mannon	18 MAY 64	
C	CHANGED PER TDRR 09779 DR CHK APPD G. Mannon	10 Jun 64	
D	CHANGED PER TDRR 12926 DR J.P. Leonard CHK APPD G. Mannon	14 OCT 64	
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 14860 DR. CHK APPD G. Mannon	6 JAN 65	
F	CHANGED PER TDRR 16709 DR W. Brown CHK APPD	20 MAY 65	



F	F	F
E	E	
D	D	
C		
B		
A		
—		
—1	—2	—3

REVISION STATUS OF ASSY



NOTES.
1. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
2. PURGE & FILL FIND NO.2 PER ND1002212 WITH FLUID PER 1001491
3. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
4. FIND NUMBERS 2 & 35 ARE GOVERNMENT FURNISHED MATERIAL
5. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO. 1814398
6. USING FIND NO. 24 AS A TEMPLATE DRILL 4 HOLES $\frac{.067}{.070}$ DIA
7. STAMP .06 HIGH GOTHIC CHARACTERS PER ND1002019 & ND1002023
8. INSTALLATION OF BLOCK I AGC.
9. INSTALLATION OF BLOCK IF (100 SERIES) AGC.
10. SELECT FIND NO 20 FROM MS9353-03 THRU 05. CORRECT SIZE TO BE DETERMINED BY TUBING CO.
11. ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DWG. NO. & A-1 SUFFIX.
12. ASSEMBLE FIND NO. 15, FIND NO. 17, FIND NO. 18 & FIND NO. 19 AS SHOWN FOR 1020001-2
13. ASSEMBLE FIND NO. 37, FIND NO. 17, FIND NO. 18 & FIND NO. 19 AS SHOW FOR 1020001-3

	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	1	—	—	1020276-011	GROUND STRAP ASSY	37
NOT SHOWN	☒	☒	☒	1020339	MOUNTING KIT (BLOCK I)	REF
NOT SHOWN	☒	☒	☒	1020338	MOUNTING KIT (BLOCK IF)	REF
	1	1	—	MS35335-60	WASHER, LOCK, FLAT-EXTERNAL TOOTH	36
SEE NOTE 9	☒	☒	☒	1020224	INSTALLATION OF AGC TO HAND FIX	REF
SEE NOTE 8	☒	☒	☒	1020107	INSTALLATION OF AGC TO HAND. FIX.	REF
	1	1	—	1021521	COLD PLATE ASSY	35
	1	1	—	1020233	MANIFOLD & TUBE ASSY	34
	1	1	1	1006241	PLUG, PROTECTIVE PLASTIC	33
	1	1	1	1006240	CAP, PROTECTIVE PLASTIC	32
	4	4	4	MS20470A2-4	RIVET, SOLID UNIVERSAL HEAD	31
	2	2	2	MS15795-807	WASHER, FLAT	30
	2	2	2	MS35233-42	SCREW, PAN HD	29
	1	1	1	1020196	COVER, TUBING	28
	8	8	8	MS35216-55	SCREW, MACH, PAN HD CROSS RECESSED	27
	☒	1	1	1020197	PLATE, SPACER	26
SEE NOTE 3	☒	☒	☒	1014398	INTERFACE CONTROL DOC	REF
	1	1	1	1020108	PLATE, ACCESS	25
	1	1	1	1020085	PLATE IDENTIFICATION	24
	1	1	—	MS35234-65	SCREW, MACH PAN HD	23
	1	1	—	MS21919-DG2	STRAP, RETAINING	22
	1	1	—	MS35234-64	SCREW, MACH PAN HD	21
	1	1	—	SEE NOTE 10	CLAMP, LOOP	20
	3	3	—	MS21044C3	NUT, SELF-LOCKING.	19
	4	4	—	MS15795-808	WASHER, PLAIN	18
	1	1	—	MS35234-64	SCREW, MACH PAN HD	17
	1	1	—	1020297	PLATFORM ASSY HAND. FIXTURE	16
	—	1	—	1020276-000	GROUND STRAP ASSY	15
	2	2	2	AN821-4D	ELBOW	14
	2	2	2	MS35200-72	SCREW, MACH FLAT CSK HD	13
	4	4	4	1006274-1	SCREW, EYE	12
	2	2	2	AN815-4D	UNION	11
	2	2	2	MS28778-4	PACKING, PREFORMED	10
	1	1	1	1000135	COUPLING-HALF, MALE	9
	1	1	1	1006659-1	COUPLING-HALF, FEMALE	8
	1	1	1	1020067-1	HOSE, HYDRAULIC	7
	1	1	1	1020067-2	HOSE, HYDRAULIC	6
	4	4	4	MS16995-65	SCREW, CAP SOC HD	5
	1	1	1	1014399	COVER, THRM INSULATOR	4
	—	—	1	1014392	PLATFORM ASSY HANDLING FIXTURE	3
SEE NOTE 4	—	—	1	1015422	COLD PLATE ASSY	2
	—	—	1	~~1014493~~	~~MANIFOLD & TUBE ASSY~~	1

LIST OF MATERIALS

1020107		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	RAYTHEON CO. LEXINGTON, MASS. CONTRACT NO. NAS 9-498
NEXT ASSY	USED ON	MATERIAL	DRAWN J.S. Byer DATE
APPLICATION		HEAT TREATMENT	CHECKED W.J. Gifford 4 OCT 63
		FINAL FINISH	APPROVAL APPROVAL APPROVAL NASA APPROVAL MIT APPROVAL MIT APPROVAL

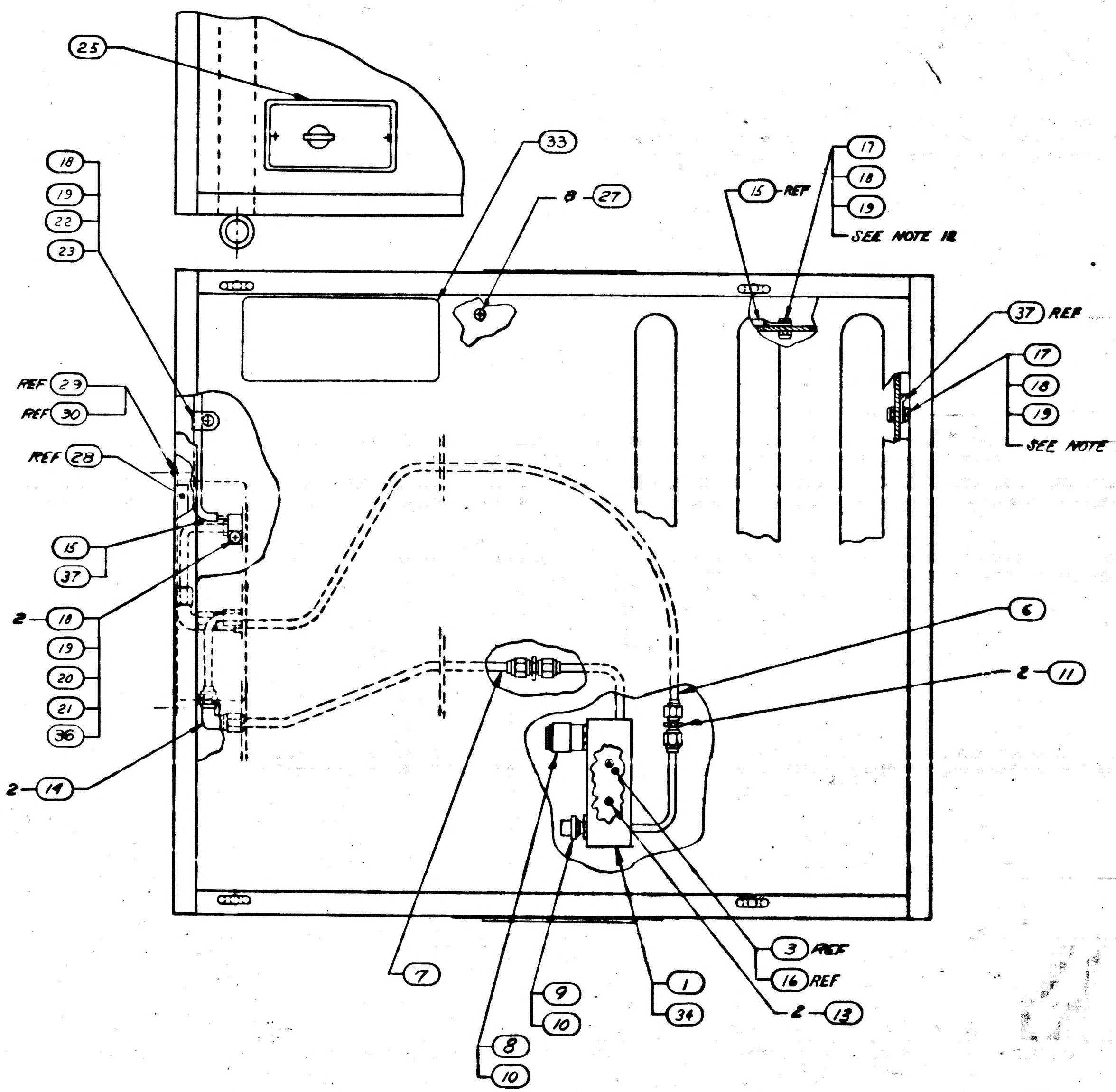
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

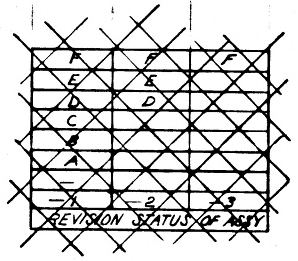
HANDLING FIXTURE,
AGC

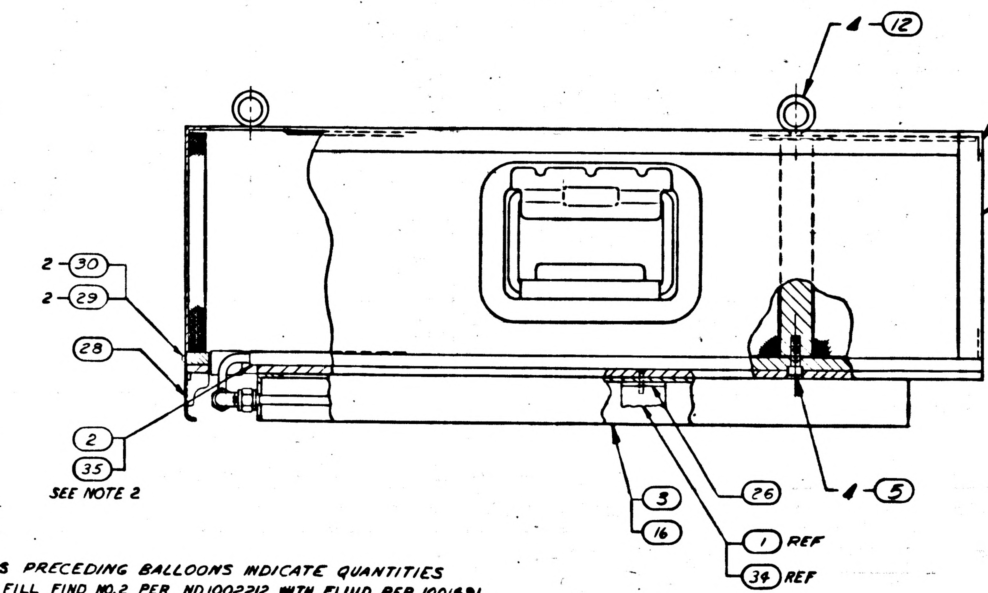
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020001
SCALE 1/2 WT
SHEET 1 OF 1

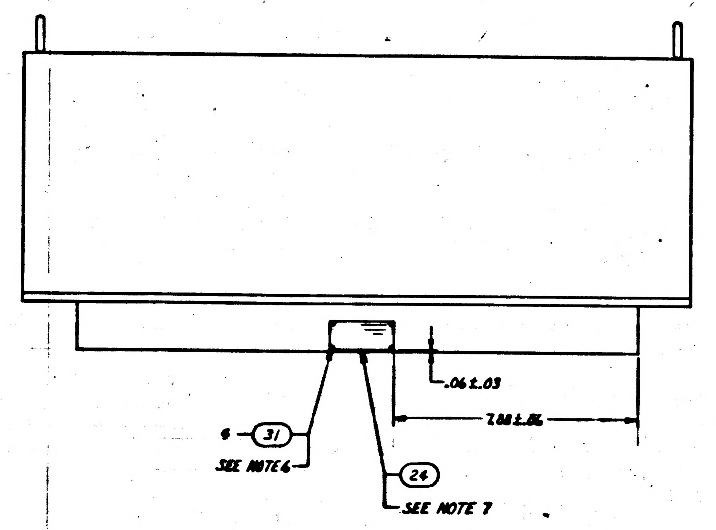
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO 04807		
A	CHANGED PER TDRR 06768 DR J.P. Leonard CHK J. Waltz APPD	11 MAR 64	KCB
B	CHANGED PER TDRR 08125 DR. W. Brown CHK. Q.G.C. APPD	12 MAY 64	KCB
C	CHANGED PER TDRR 09779 DR CHK APPD	16 JUN 64	KCB
D	CHANGED PER TDRR 12926 DR J.P. Leonard CHK APPD	14 OCT 64	KCB
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 14860 DR. CHK APPD	6 JAN 65	KCB
F	CHANGED PER TDRR 16709 DR CHK APPD	65	
G	CHANGED PER TDRR 26577 DR CHK APPD KCB	3/23/66	




F
F
F
E
E
D
D
C
B
A
1
2
3
REVISION STATUS OF ASSY





	QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
NOT SHOWN SEE NOTE 14	12	–	–	–	2016351	SCREW, CAP, SOCKET HEAD	38
	1	1	–	–	1020276-011	GROUND STRAP ASSY	37
NOT SHOWN	X	X	X	X	1020339	MOUNTING KIT (BLOCK I)	REF
NOT SHOWN	—	X	X	—	1020338	MOUNTING KIT (BLOCK IF)	REF
	1	1	1	–	MS35335-60	WASHER, LOCK, FLAT-EXTERNAL TOOTH	36
SEE NOTE 9	X	X	X	—	1020224	INSTALLATION OF AGC TO HAND FIX	REF
SEE NOTE 8	X	X	X	X	1020107	INSTALLATION OF AGC TO HAND. FIX	REF
SEE NOTE 4	1	1	1	–	1021521	COLD PLATE ASSY	35
	1	1	1	–	1020233	MANIFOLD & TUBE ASSY	34
	1	1	1	1	1006241	PLUG, PROTECTIVE PLASTIC	33
	1	1	1	1	1006240	CAP, PROTECTIVE PLASTIC	32
	4	4	4	4	MS20470A2-4	RIVET, SOLID UNIVERSAL HEAD	31
	2	2	2	2	MS15795-807	WASHER, FLAT	30
	2	2	2	2	MS35233-42	SCREW, PAN HD	29
	1	1	1	1	1020196	COVER, TUBING	28
	8	8	8	8	MS35216-55	SCREW, MACH, PAN HD CROSS RECESSED	27
	—	—	1	1	1020197	PLATE, SPACER	26
SEE NOTE 3	X	X	X	X	1014398	INTERFACE CONTROL DOC	REF
	1	1	1	1	1020108	PLATE, ACCESS	25
	1	1	1	1	1020085	PLATE IDENTIFICATION	24
	1	1	1	–	MS35234-65	SCREW, MACH PAN HD	23
	1	1	1	–	MS21919-DG2	STRAP, RETAINING	22
	1	1	1	–	MS35234-64	SCREW, MACH PAN HD	21
	1	1	1	–	SEE NOTE 10	CLAMP, LOOP	20
	3	3	3	–	MS21044C3	NUT, SELF-LOCKING	19
	4	4	4	–	MS15795-808	WASHER, PLAIN	18
	1	1	1	–	MS35234-64	SCREW, MACH PAN HD	17
	1	1	1	–	1020297	PLATFORM ASSY HAND. FIXTURE	16
	—	—	1	–	1020276-000	GROUND STRAP ASSY	15
	2	2	2	2	AN821-4D	ELBOW	14
	2	2	2	2	MS35200-72	SCREW, MACH FLAT CSK HD	13
	4	4	4	4	1006674-1	SCREW, EYE	12
	2	2	2	2	AN815-4D	UNION	11
	2	2	2	2	MS28778-4	PACKING, PREFORMED	10
	1	1	1	1	1000135	COUPLING-HALF, MALE	9
	1	1	1	1	1006659-1	COUPLING-HALF, FEMALE	8
	1	1	1	1	1020067-1	HOSE, HYDRAULIC	7
	1	1	1	1	1020067-2	HOSE, HYDRAULIC	6
	4	4	4	4	MS16995-65	SCREW, CAP SOC HD	5
	1	1	1	1	1014399	COVER, THERM INSULATOR	4
SEE NOTE 4	—	—	—	1	1014392	PLATFORM ASSY HANDLING FIXTURE	3
	—	—	—	1	1015422	COLD PLATE ASSY	2
	~~—~~	~~—~~	~~—~~	~~1~~	~~1014493~~	~~MANIFOLD & TUBE ASSY~~	~~1~~

LIST OF MATERIALS

NOTES.

1. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
2. PURGE & FILL FIND NO.2 PER ND1002212 WITH FLUID PER 1001491
3. CHANGES AND/OR REVISIONS OF 1020001 AND SUBASSEMBLIES ARE SUBJECT TO THE DIMENSIONS AND FEATURES DEFINED IN 1014398
4. FIND NUMBERS 2 & 35 ARE GOVERNMENT FURNISHED MATERIAL
5. CHANGES TO THIS DWG MUST BE REFLECTED ON ICD DWG NO 1014398
6. USING FIND NO. 24 AS A TEMPLATE DRILL 4 HOLES $\begin{smallmatrix}.067\\.070\end{smallmatrix}$ DIA
7. STAMP .06 HIGH GOTHIC CHARACTERS PER ND1002019 & ND1002023
8. INSTALLATION OF BLOCK I AGC.
9. INSTALLATION OF BLOCK IF (100 SERIES) AGC.
10. SELECT FIND NO 20 FROM MS9353-03 THRU 05. CORRECT SIZE TO BE DETERMINED BY TUBING OD.
11. ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DWG. NO. & A-1 SUFFIX.
12. ASSEMBLE FIND NO. 15, FIND NO. 17, FIND NO. 18 & FIND NO. 19 AS SHOWN FOR 1020001-2
13. ASSEMBLE FIND NO. 37, FIND NO. 17, FIND NO. 18 & FIND NO. 19 AS SHOWN FOR 1020001-3 & 1020001-4
14. FIND 38 SHALL BE SUPPLIED AND IDENTIFIED PER ND1002019

MASTER

1900030	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

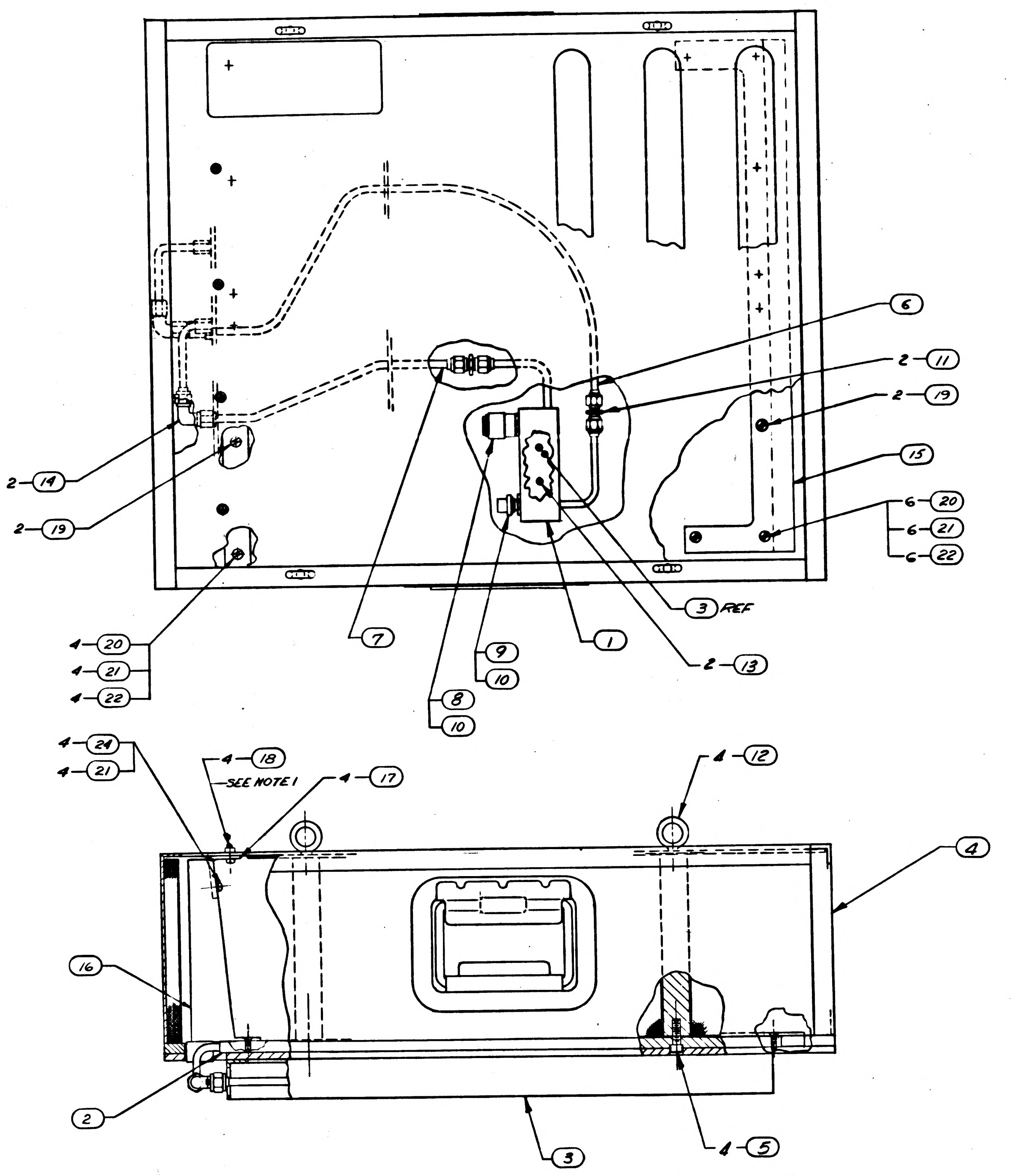
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN J.S. DATE 3 SEP 63
CHECKED W.J. Gifford 4 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HANDLING FIXTURE, AGC

CODE IDENT NO. 49956 SIZE J NASA DRAWING NO. 1020001
SCALE 1/2 WT SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO.		



NOTES:
1. ASSEMBLE FIND NO. 18 USING FIND NO. 23
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
4	MS35234-62	SCREW, MCH, PAN HD SLOTTED	24
AR	MIL-S-40083-(1)31	SEALING COMPOUND	23
10	MS 21044-C3	NUT, SELF LOCKING	22
14	MS15795-308	WASHER, PLAIN FLAT	21
10	MS35201-60	SCREW, MCH, FLAT CSK HD	20
4	MS35201-55	SCREW, MCH, FLAT CSK HD	19
8	MS35234-60	SCREW, MCH, PAN HD, SLOTTED	18
4	1004272	BRACKET	17
1		END CONNECTOR ASSY	16
1	1003180	TOE PLATE	15
2	AN821-4D	ELBOW	14
2	MS35200-55	SCREW, MACH FLAT CSK HD	13
4	1006674-1	SCREW, EYE	12
2	AN815-4D	UNION	11
2	MS 28778-4	PACKING, PREFORMED	10
1	1000135	COUPLING-HALF, MALE	9
1	1006659-1	COUPLING-HALF, FEMALE	8
1	1020067-1	HOSE, HYDRAULIC	7
1	1020067-2	HOSE, HYDRAULIC	6
4	MS16995-65	SCREW, CAP SOC HD	5
1	1014399	COVER, THRM INSULATOR	4
1	1014392	BASE, HANDLING FIXTURE	3
1	1014338	COLD PLATE ASSY	2
1	1014493	MANIFOLD & TUBE ASSY	1

NEXT ASSY	USED ON
1020017	1020018

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN J. S. [illegible] DATE [illegible]
CHECKED W. J. Gifford 4 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HANDLING FIXTURE,
AGC COMPUTER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020001
SCALE 1/2
WT
SHEET 1 OF 1

1020001

MASTER

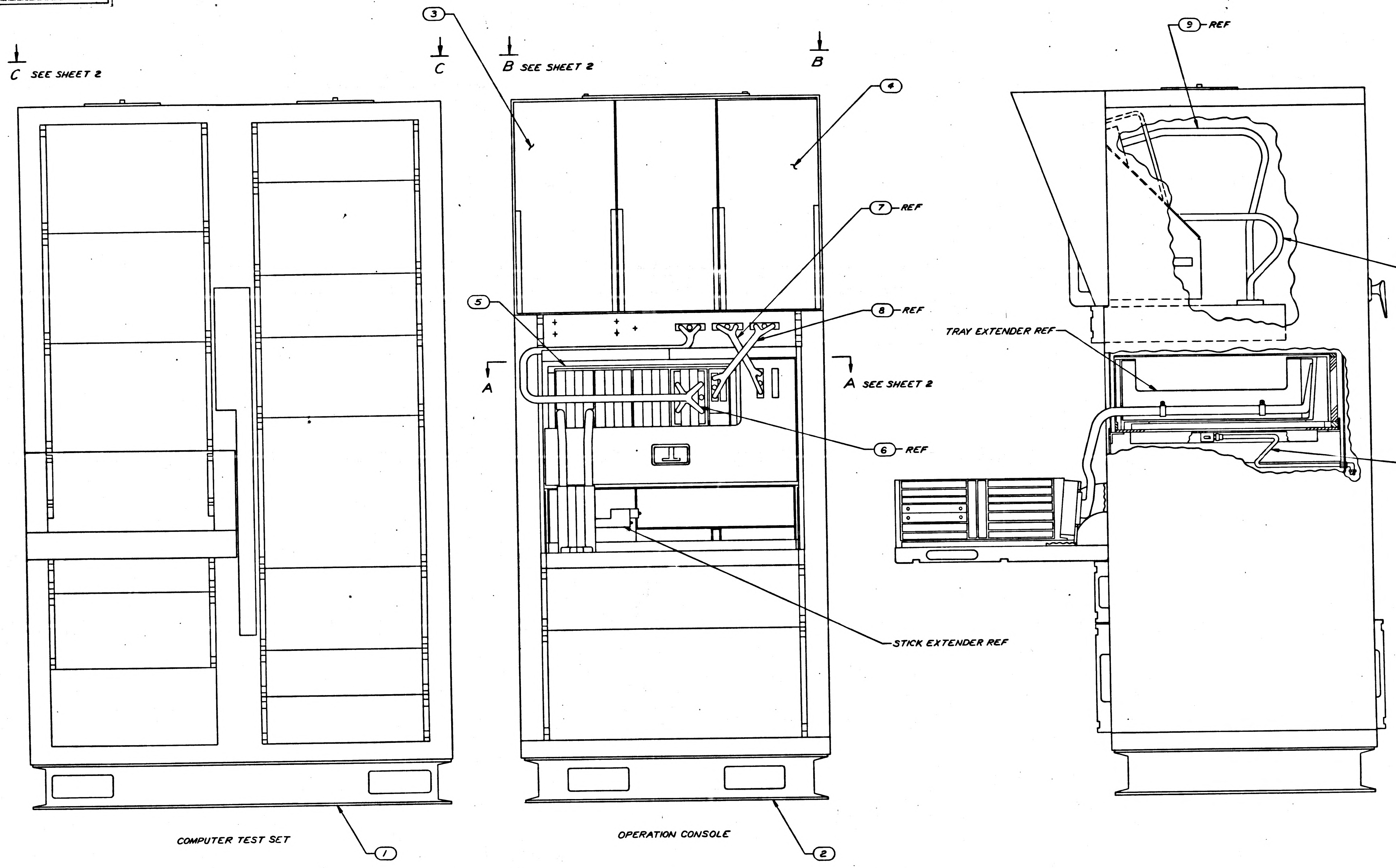
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

1050005

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
B	THIS SHEET ADDED PER TDRR 06040	64	



FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 06040 DATE 2/18/64

Ⓑ THIS SHEET ADDED

FOR INFORMATION ONLY

B	B
—	A
SHEET 1	SHEET 2

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
REF	1020109-2	CABLE ASSY W32	25
REF	1020109-3	W31	24
REF	1020109-1	W30	23
REF	1006668-9	W29	22
REF	-8	W28	21
REF	-7	W27	20
REF	-6	W26	19
REF	-5	W25	18
REF	-4	W24	17
REF	-3	W23	16
REF	-2	W22	15
REF	1006668-1	CABLE ASSY W21	14
REF	1020093	TEST MOUNT CABLE B	13
REF	1020092	TEST MOUNT CABLE A	12
REF	AN6270-4-41	HOSE ASSY	11
REF	1020095	NAV DSKY TO JUNCTION BOX	10
REF	1020094	MAIN DSKY TO JUNCTION BOX	9
REF	1020097	TEST CABLE C	8
REF	1020096	TEST CABLE B	7
REF	1020102	TEST CABLE A	6
1	1020107	AGC CMPTR TO HANDLING FIX ASSY	5
1	1020105	NAV DSKY TO HANDLING FIX ASSY	4
1	1020106	MAIN DSKY TO HANDLING FIX ASSY	3
1	1014465	OPERATION CONSOLE	2
1	1014156	COMPUTER TEST SET	1

LIST OF MATERIALS

FINAL	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 7
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

AGC/GSE INTERCONNECTIONS
(AGC SYSTEM TEST)

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	J	1020002

SCALE 1/4 WT SHEET 1 OF 2

1020002

MASTER

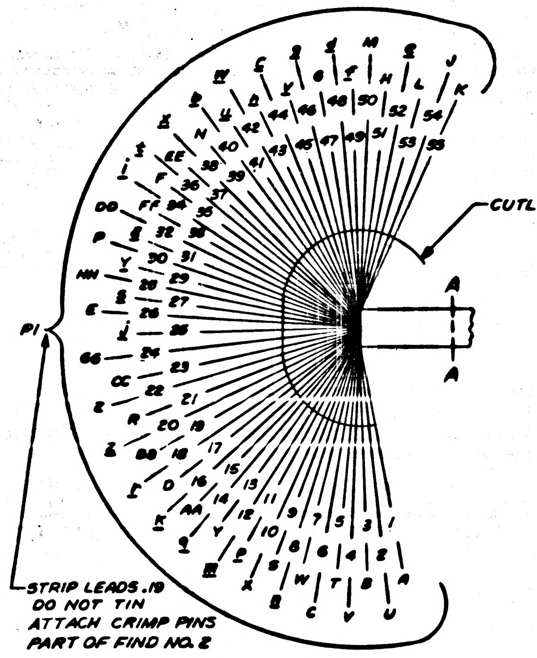
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

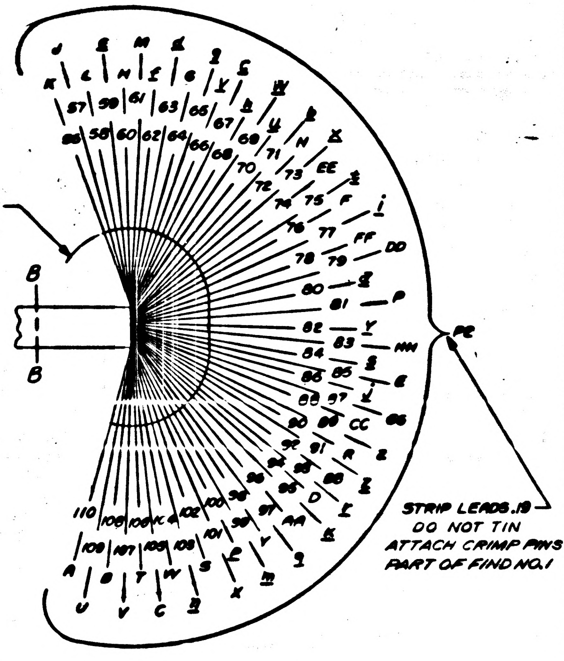
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
	CL E RELEASED PER TDRR		
A	CHANGED PER TDRR 07230 DR. CHK A. Cappiano APPD	64	

ASSEMBLY INFORMATION CHART

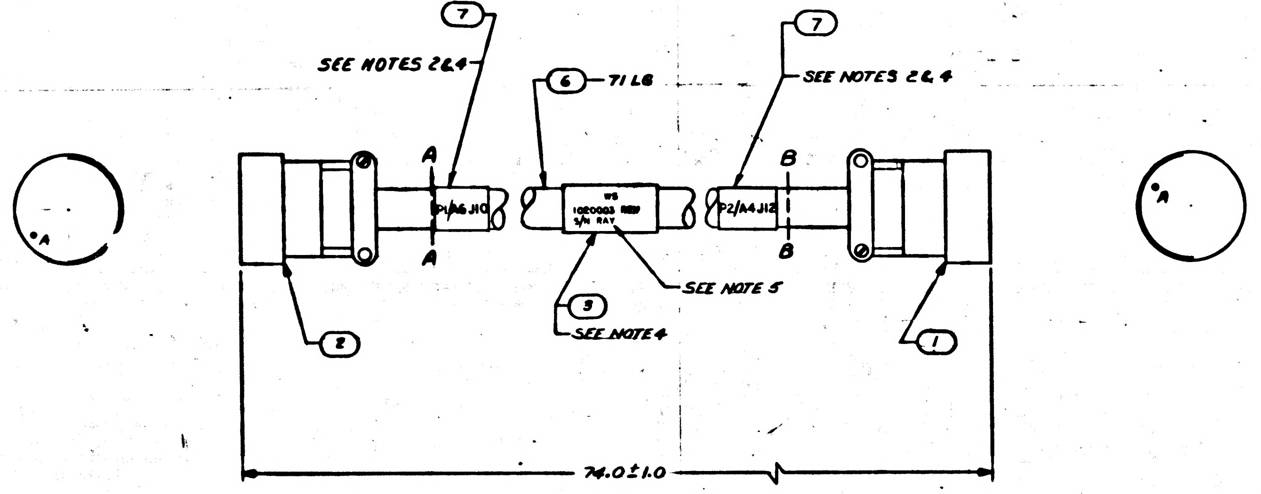
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	4	110	
	3	WHT			108	
	6	BLK	22	4	105	
	17	WHT			34	
	26	BLK	22	4	85	
	35	WHT			76	
	47	BLK	22	4	64	
	51	WHT			60	
	54	BLK	22	4	57	
	55	WHT			56	
	53	BLK	22	4	58	
	50	WHT			61	
	39	BLK	22	4	72	
	30	WHT			81	
	21	BLK	22	4	90	
	9	WHT			102	
	5	BLK	22	4	106	
	2	WHT			109	
	4	BLK	22	4	107	
	7	WHT			104	
	10	BLK	22	4	101	
	13	WHT			98	
	31	BLK	22	4	80	
	40	WHT			71	
	44	BLK	22	4	67	
	48	WHT			63	
	52	BLK	22	4	59	
	49	WHT			62	
	46	BLK	22	4	65	
	43	WHT			68	
	34	BLK	22	4	77	
	25	WHT			86	
	16	BLK	22	4	95	
	12	WHT			99	
	8	BLK	22	4	103	
	11	WHT			100	
	14	BLK	22	4	97	
	18	WHT			93	
	27	BLK	22	4	84	
	36	WHT			75	
	41	BLK	22	4	70	
	45	WHT			66	
	42	BLK	22	4	69	
	38	WHT			73	
	29	BLK	22	4	82	
	20	WHT			91	
	15	BLK	22	4	96	
	19	WHT			92	
	23	BLK	22	4	88	
	32	WHT			79	
	37	BLK	22	4	74	
	33	WHT			78	
	24	BLK	22	4	87	
	28	WHT			83	
	22	BLK	22	5	89	

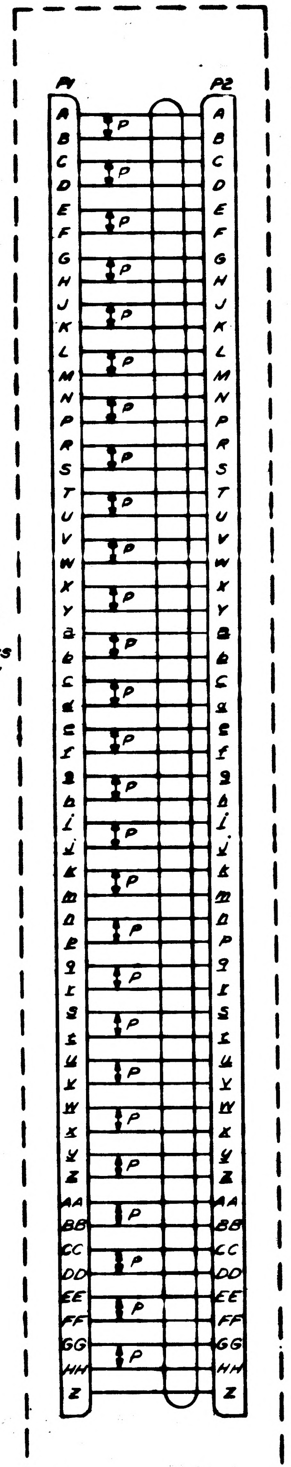


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2



STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1





ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0435 DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U2 GRADE A CLASS I
   CATEGORY I, FOR FIND NO. 6 AWG 5/8
4. BOND USING TETRAHYDROFURAN WITH
   10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 3	SLEEVING	6
AR	MIL-W-16878/4 TYPE E 22 BLK	WIRE, ELECTRICAL	5
AR	1014341-11	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-22-55PX	CONNECTOR	2
1	MS3126F-22-55P	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014486	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-[illegible]
DRAWN
CHECKED A. Cappiano
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
GOVT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W5
AGC/CTS OPERATION CONSOLE

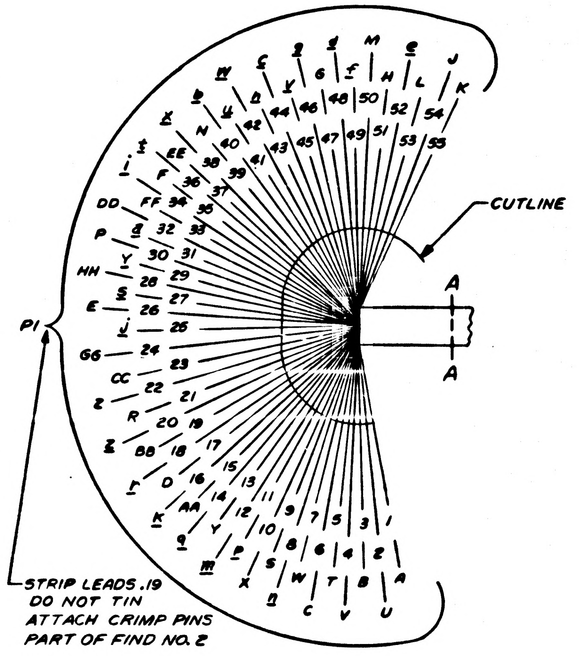
SIZE J
NASA DRAWING NO. 1020003

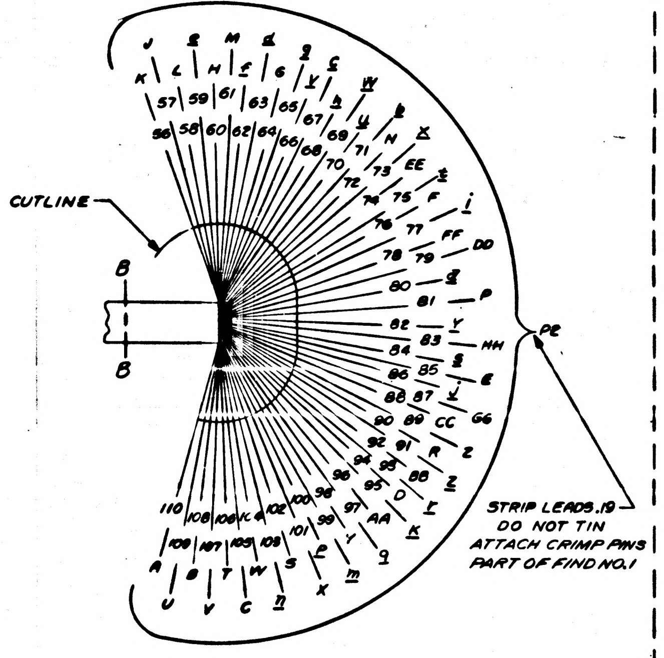
1020003

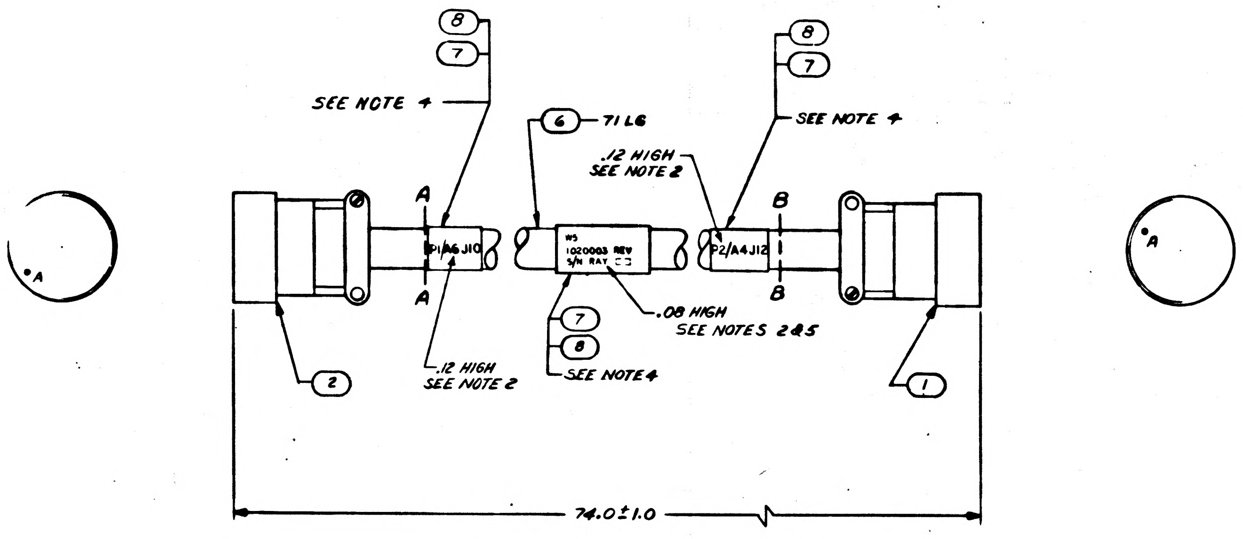
1020003

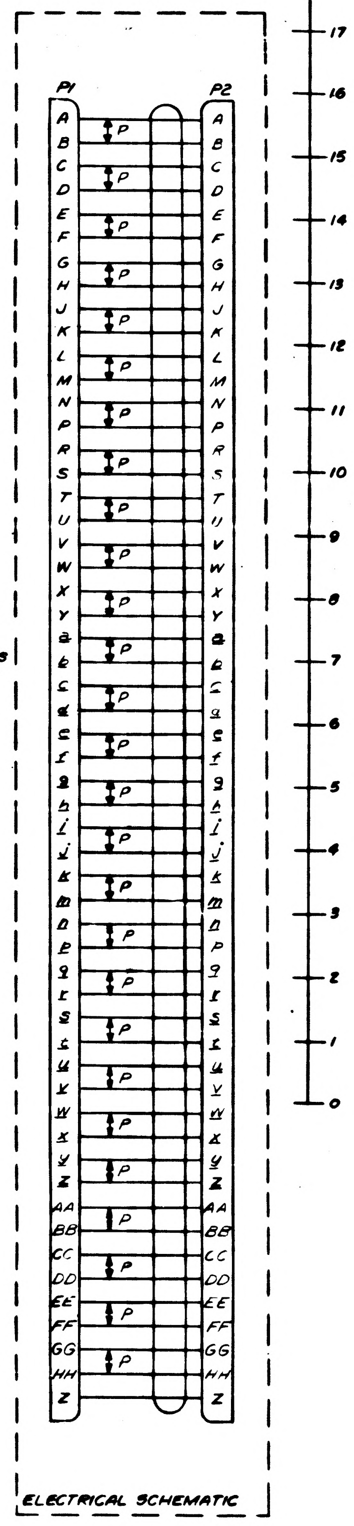
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	~~CC B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 07230 DR J.P. Leonard CHK A Cappiano APPD M Conley	15 APR 64	
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18942 DR R Burt CHK R. Moss APPD M Conley	30 June 65	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	4	110	
	3	WHT			108	
	6	BLK	22	4	105	
	17	WHT			94	
	26	BLK	22	4	85	
	35	WHT			76	
	47	BLK	22	4	64	
	51	WHT			60	
	54	BLK	22	4	57	
	55	WHT			56	
	53	BLK	22	4	58	
	50	WHT			61	
	39	BLK	22	4	72	
	30	WHT			81	
	21	BLK	22	4	90	
	9	WHT			102	
	5	BLK	22	4	106	
	2	WHT			109	
	4	BLK	22	4	107	
	7	WHT			104	
	10	BLK	22	4	101	
	13	WHT			98	
	31	BLK	22	4	80	
	40	WHT			71	
	44	BLK	22	4	67	
	48	WHT			63	
	52	BLK	22	4	59	
	49	WHT			62	
	46	BLK	22	4	65	
	43	WHT			68	
	34	BLK	22	4	77	
	25	WHT			86	
	16	BLK	22	4	95	
	12	WHT			99	
	8	BLK	22	4	103	
	11	WHT			100	
	14	BLK	22	4	97	
	18	WHT			93	
	27	BLK	22	4	84	
	36	WHT			75	
	41	BLK	22	4	70	
	45	WHT			66	
	42	BLK	22	[illegible]	69	
	38	WHT			73	
	29	BLK	[illegible]	[illegible]	82	
	20	WHT			91	
	15	BLK	[illegible]	[illegible]	96	
	19	WHT			92	
	23	BLK	[illegible]	4	88	
	32	WHT			79	
	37	BLK	[illegible]	4	74	
	33	WHT			78	
	24	BLK	[illegible]	4	87	
	28	WHT			83	
	22	BLK	22	5	89	


P1
CUTLINE
A
A
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2


P2
CUTLINE
B
B
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1


8
7
SEE NOTE 4
6
71 L6
.12 HIGH
SEE NOTE 2
8
7
SEE NOTE 4
A
A
P1/A6 J10
W5
1020003 REV
S/N RAY
P2/A4 J12
B
B
2
.12 HIGH
SEE NOTE 2
7
8
SEE NOTE 4
.08 HIGH
SEE NOTES 2&5
1
74.0±1.0
A
A


P1
P2
P
ELECTRICAL SCHEMATIC

NOTES:
1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. MIL-I-631 TYPE F, FORM Ua GRADE a CLASS I CATEGORY I. FOR FIND NO. 6 AWG 5/8
4. BOND USING FIND NO 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6 CRIMP PER ND1002206

	AR	1006253	ADHESIVE	8
	3	1014472-4A	BAND MARKER, CABLE	7
*	6.0	SEE NOTE 3	SLEEVING	6
*	6.0	MIL-W-16878/4 TYPE E 22 BLK	WIRE, ELECTRICAL	5
*	160	1014341-11	WIRE, ELECTRICAL	4
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-22-55PX	CONNECTOR	2
	1	MS3126F-22-55P	CONNECTOR	
	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN H Carlson DATE 8-30-63
CHECKED A Cappiano
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W5
OPERATION CONSOLE

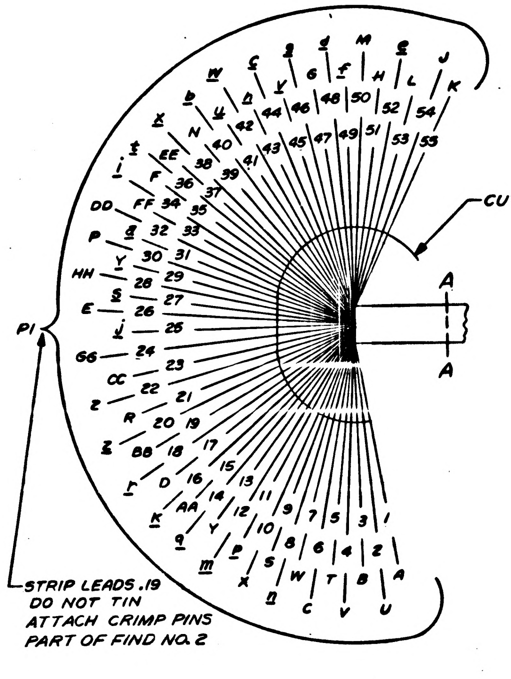
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020003
SCALE 1/1
WT
SHEET 1 OF 1

1020003 B

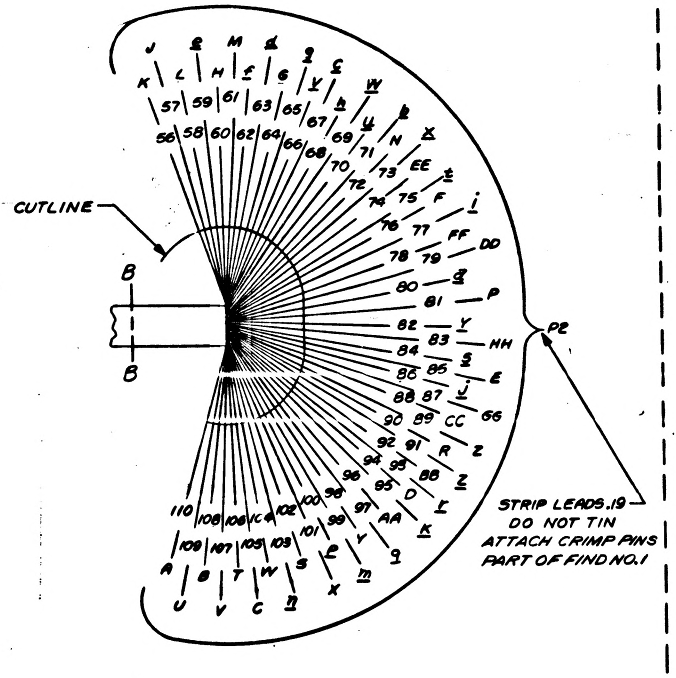
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 0435		

ASSEMBLY INFORMATION CHART

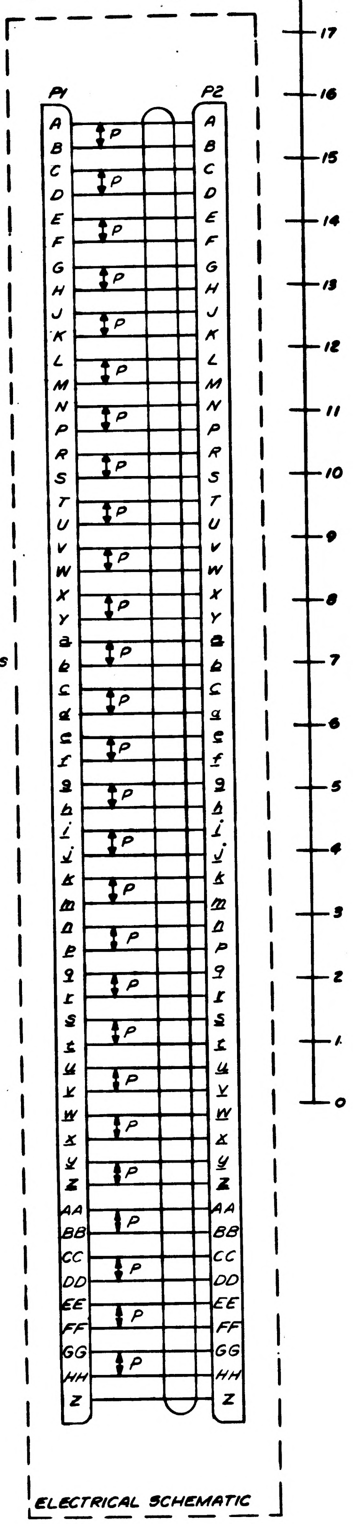
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	4	110	
	3	WHT			108	
	6	BLK	22	4	105	
	17	WHT			94	
	26	BLK	22	4	85	
	35	WHT			76	
	47	BLK	22	4	64	
	51	WHT			60	
	54	BLK	22	4	57	
	55	WHT			56	
	53	BLK	22	4	58	
	50	WHT			61	
	39	BLK	22	4	72	
	30	WHT			81	
	21	BLK	22	4	90	
	9	WHT			102	
	5	BLK	22	4	106	
	2	WHT			109	
	4	BLK	22	4	107	
	7	WHT			104	
	10	BLK	22	4	101	
	13	WHT			98	
	31	BLK	22	4	80	
	40	WHT			71	
	44	BLK	22	4	67	
	48	WHT			63	
	52	BLK	22	4	59	
	49	WHT			62	
	46	BLK	22	4	65	
	43	WHT			68	
	34	BLK	22	4	77	
	25	WHT			86	
	16	BLK	22	4	95	
	12	WHT			99	
	8	BLK	22	4	103	
	11	WHT			100	
	14	BLK	22	4	97	
	18	WHT			93	
	27	BLK	22	4	84	
	36	WHT			75	
	41	BLK	22	4	70	
	45	WHT			66	
	42	BLK	22	4	69	
	38	WHT			73	
	29	BLK	22	4	82	
	20	WHT			91	
	15	BLK	22	4	96	
	19	WHT			92	
	23	BLK	22	4	88	
	32	WHT			79	
	37	BLK	22	4	74	
	33	WHT			78	
	24	BLK	22	4	87	
	28	WHT			83	
	22	BLK	22	5	89	


CUTLINE
A
A
P1
1 2 3 … 55
A B C … Z, AA … HH

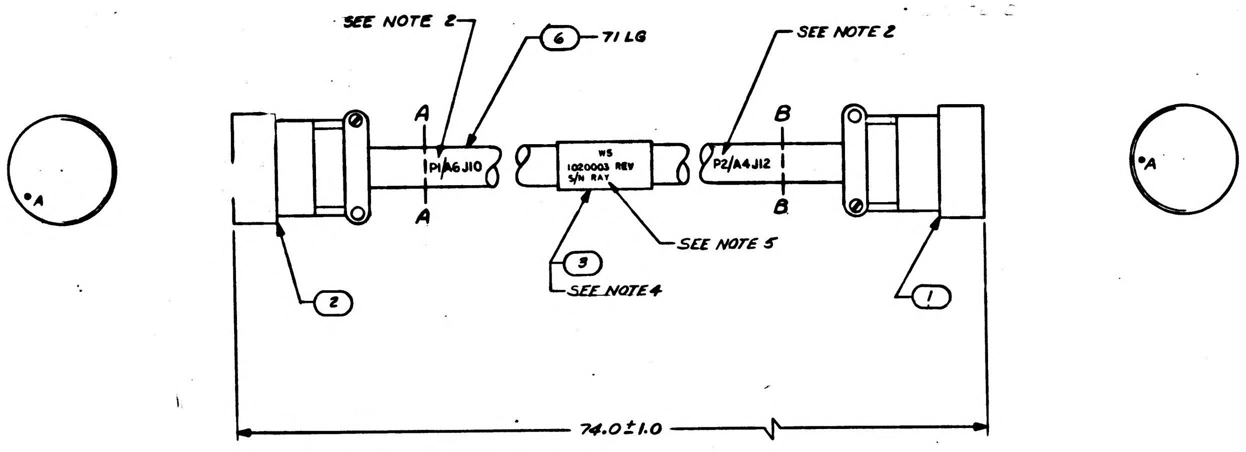
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2


CUTLINE
B
B
P2
56 57 58 … 110
A B C … Z, AA … HH

STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1


P1
P2
A B C D E F G H J K L M N P R S T U V W X Y Z a b c d e f g h i j k m n p q r s t u v w x y z AA BB CC DD EE FF GG HH Z
P

ELECTRICAL SCHEMATIC


SEE NOTE 2
6
71 LG
SEE NOTE 2
A
A
P1/A6J10
W5
1020003 REV
S/N RAY
P2/A4J12
B
B
3
SEE NOTE 4
SEE NOTE 5
2
1
A
A
74.0±1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0435 DATE 24 Oct 63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U2 GRADE A CLASS I CATEGORY I, FOR FIND NO. 6 AWG 5/8
4. BOND FIND NO. 3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	SEE NOTE 3	SLEEVING	6
AR	ND1002181 TYPE I CL I	WIRE, ELECTRICAL AWG 22 BLK	5
AR	1014341-11	WIRE, ELECTRICAL	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-22-55PX	CONNECTOR	2
1	MS3126F-22-55P	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE 8-30-63
CHECKED A. Casey 5 Oct 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W5
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020003
SCALE 1/1
WT
SHEET 1 OF 1

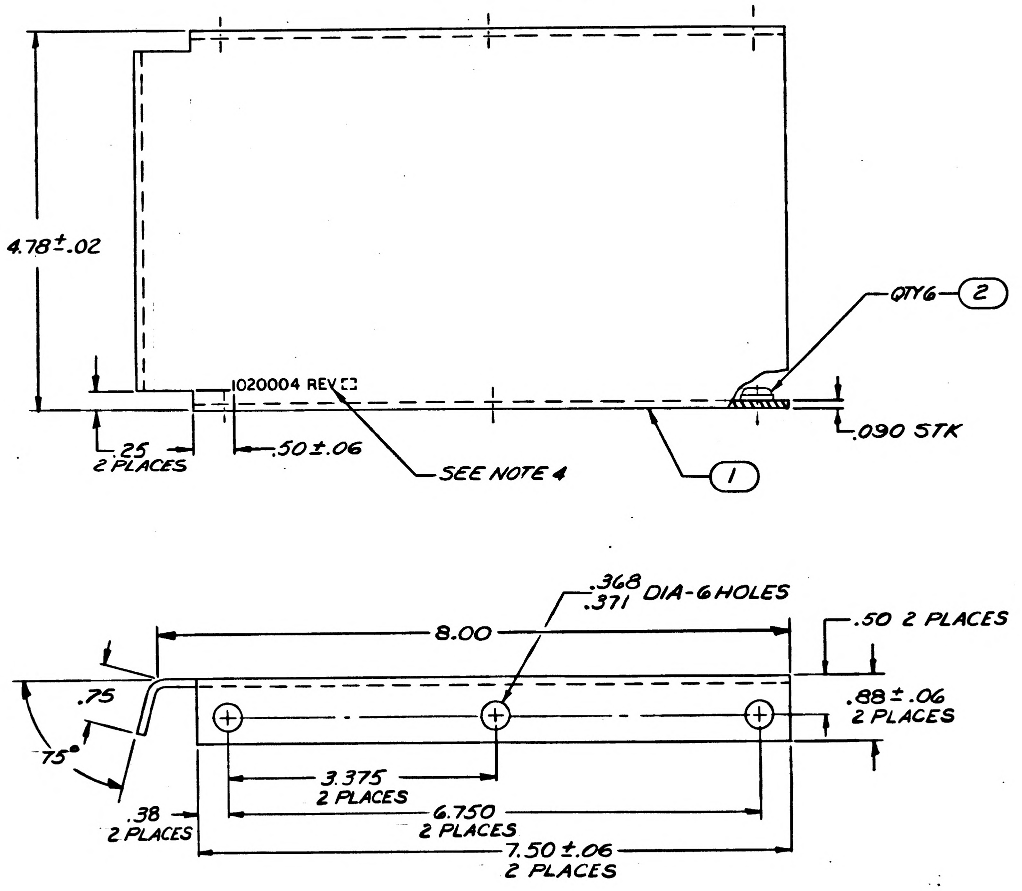
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	[illegible]	[illegible]



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 03996 DATE 10/17/63

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES
3. CHROMATE PER MIL-C-5541
4. MARK .12 HIGH BLACK CHARACTERS PER ND1002019

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
6	1006999-8	NUT, SELF-CLINCHING	2
1	1020004-1	COVER	1

NEXT ASSY	USED ON
1020010	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±
DECIMALS ±.016 ±.03
ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE
HEAT TREATMENT:
FINAL FINISH: SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 30 AUG 63
CHECKED [illegible] 16 SEPT. 63
APPROVAL H. Morse 4 OCT 63
APPROVAL [illegible] 4 Oct 63
APPROVAL [illegible] 10/4/63
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 10/4/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER PLATE, ACCESS
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020004
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

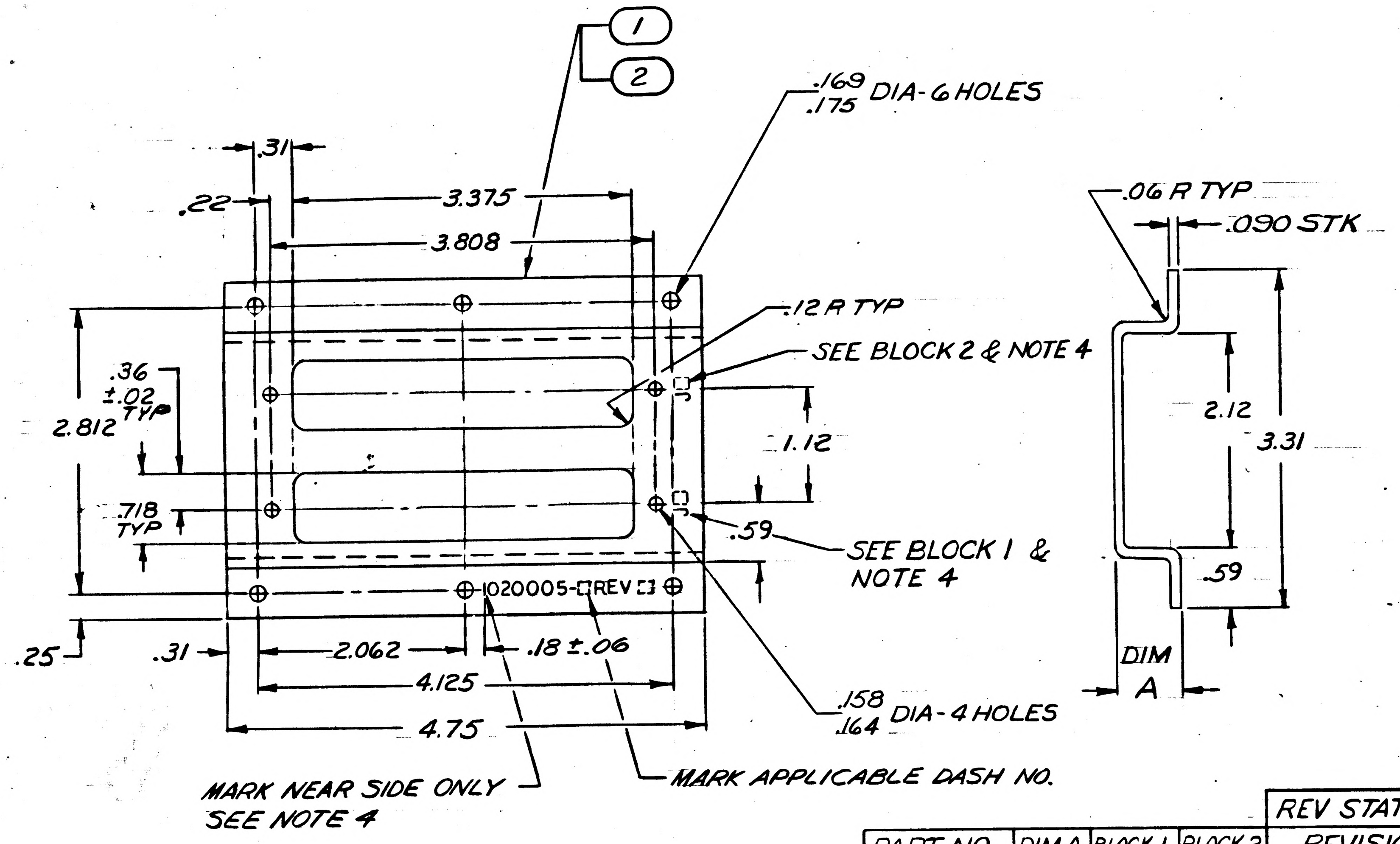
1020004

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04134	10/31/63	WR



1
2
.169
.175 DIA-6 HOLES
.31
.22
3.375
3.808
.12 R TYP
SEE BLOCK 2 & NOTE 4
.36
±.02
TYP
2.812
1.12
.718
TYP
.59
SEE BLOCK 1 & NOTE 4
1020005-□REV□
.25
.31
2.062
.18 ±.06
4.125
4.75
.158
.164 DIA-4 HOLES
MARK NEAR SIDE ONLY
SEE NOTE 4
MARK APPLICABLE DASH NO.
.06 R TYP
.090 STK
2.12
3.31
.59
DIM
A

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO 04134 DATE 10/31/63

PART NO.	DIM A	BLOCK 1	BLOCK 2	REV STATUS OF PARTS REVISION SYMBOL
1020005-1	.66	J1	J3	—
1020005-2	1.22	J2	J4	—

NOTES

1. MATL AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES
3. CHROMATE TREAT PER MIL-C-5541
4. MARK .12 HIGH BLACK CHARACTERS BOTH SIDES PER ND1002019 AS SHOWN IN CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1020005-2	BRACKET	2
1	1020005-1	BRACKET	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020073	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.016 ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498

DRAWN Dunton DATE 30 AUG 63
CHECKED David Conley 16 SEPT. 63
APPROVAL H. Morse 4 OCT 63
APPROVAL J. Yakind JJS 4 Oct 63
APPROVAL [illegible] 10/4/63
NASA APPROVAL [illegible] 10/13/63
MIT APPROVAL [illegible] 10/14/63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, CONNECTOR
AGC/CTS OPERATION CONSOLE

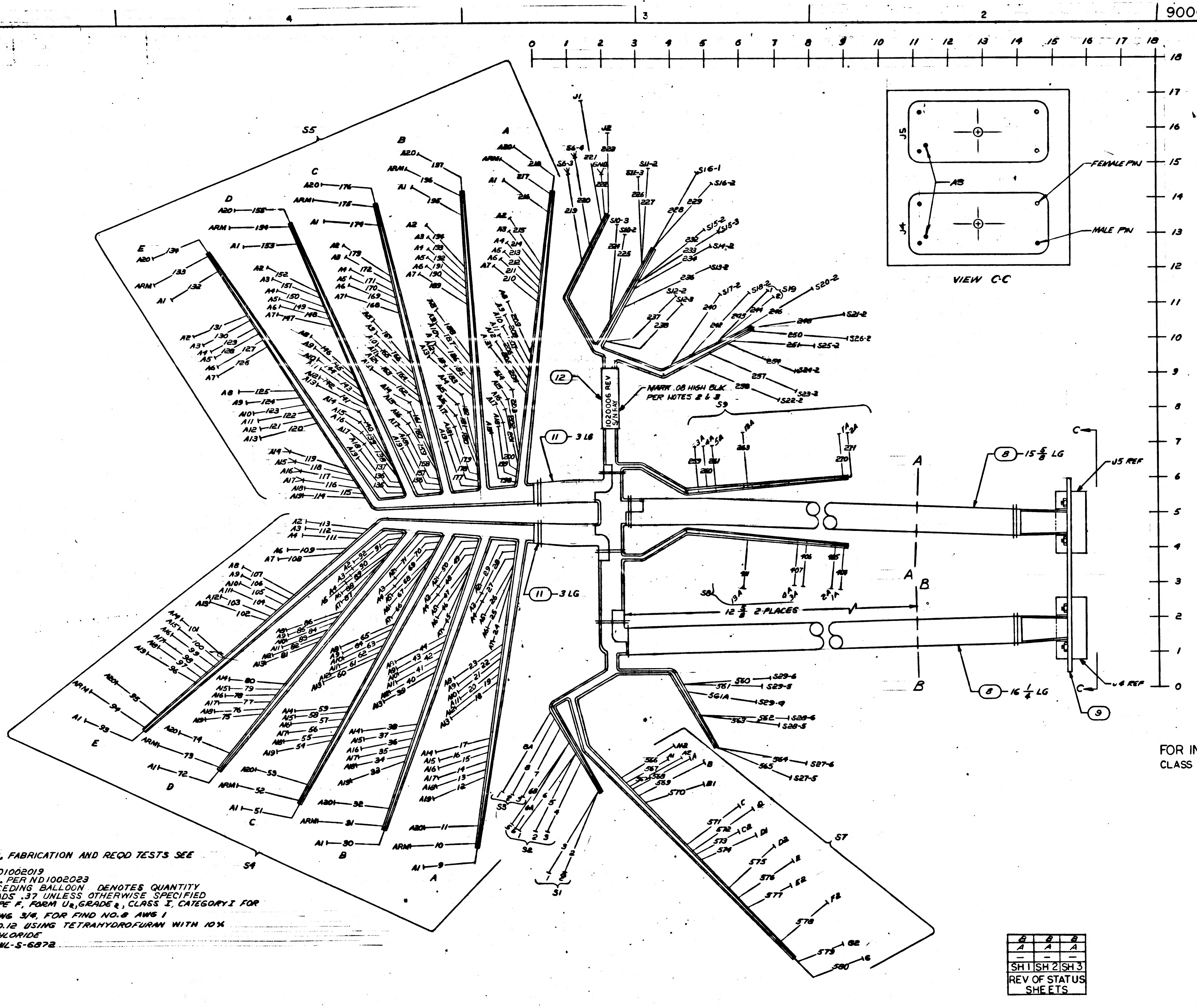
CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020005
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

9000201

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
—	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5657 DR John Manning CHK APPD		
B	CHANGED PER TDRR 06327 DR. X Matz CHK APPD	20 FEB 64	


S1
S2
S3
S4
S5
S6
S7
S8
S9
J1
J2
A
B
C
D
E
ARM1
A1
A20
MARK .08 HIGH BLK PER NOTES 2 & 3
1020006 REV S/N XXX
12
11 — 3 LG
11 — 3 LG
8 — 15 5/8 LG
8 — 16 1/4 LG
12 3/8 2 PLACES
9
J5 REF
J4 REF
A
A
B
B
C
C
VIEW C-C
J5
J4
A3
FEMALE PIN
MALE PIN
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK PER ND1002019
3. MARK SER NO. PER ND1002023
4. NUMBER PRECEDING BALLOON DENOTES QUANTITY
5. STRIP ALL LEADS .37 UNLESS OTHERWISE SPECIFIED
6. MIL-I-631 TYPE F, FORM U2, GRADE 2, CLASS I, CATEGORY I FOR FIND NO. 11 AWG 3/4, FOR FIND NO. 8 AWG 1
7. BOND FIND NO. 12 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
8. SOLDER PER MIL-S-6872

SH 1	SH 2	SH 3
B	B	B
A	A	A
—	—	—

REV OF STATUS SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
—	1020050	SCHEMATIC	REF
1	1014472-1	BAND MARKER, CABLE	12
A/R	SEE NOTE 6	SLEEVING	11
1	MS25036-5	TERMINAL LUG	10
1	1014408	PLATE, CONN ASSY	9
A/R	SEE NOTE 6	SLEEVING	8
A/R	MIL-W-16878/4 TYPE E 22 WHT	WIRE ELEC,	7
A/R	20 WHT	WIRE, ELEC	6
A/R	22 BLK	WIRE, ELEC	5
A/R	20 BLK	WIRE, ELEC	4
A/R	22 ORN	WIRE, ELEC	3
A/R	20 ORN	WIRE, ELEC	2
A/R	MIL-W-16878/4 TYPE E 20 RED	WIRE, ELEC	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014380	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Dragy DATE 8-30-63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020006
SCALE 1/1 WT SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

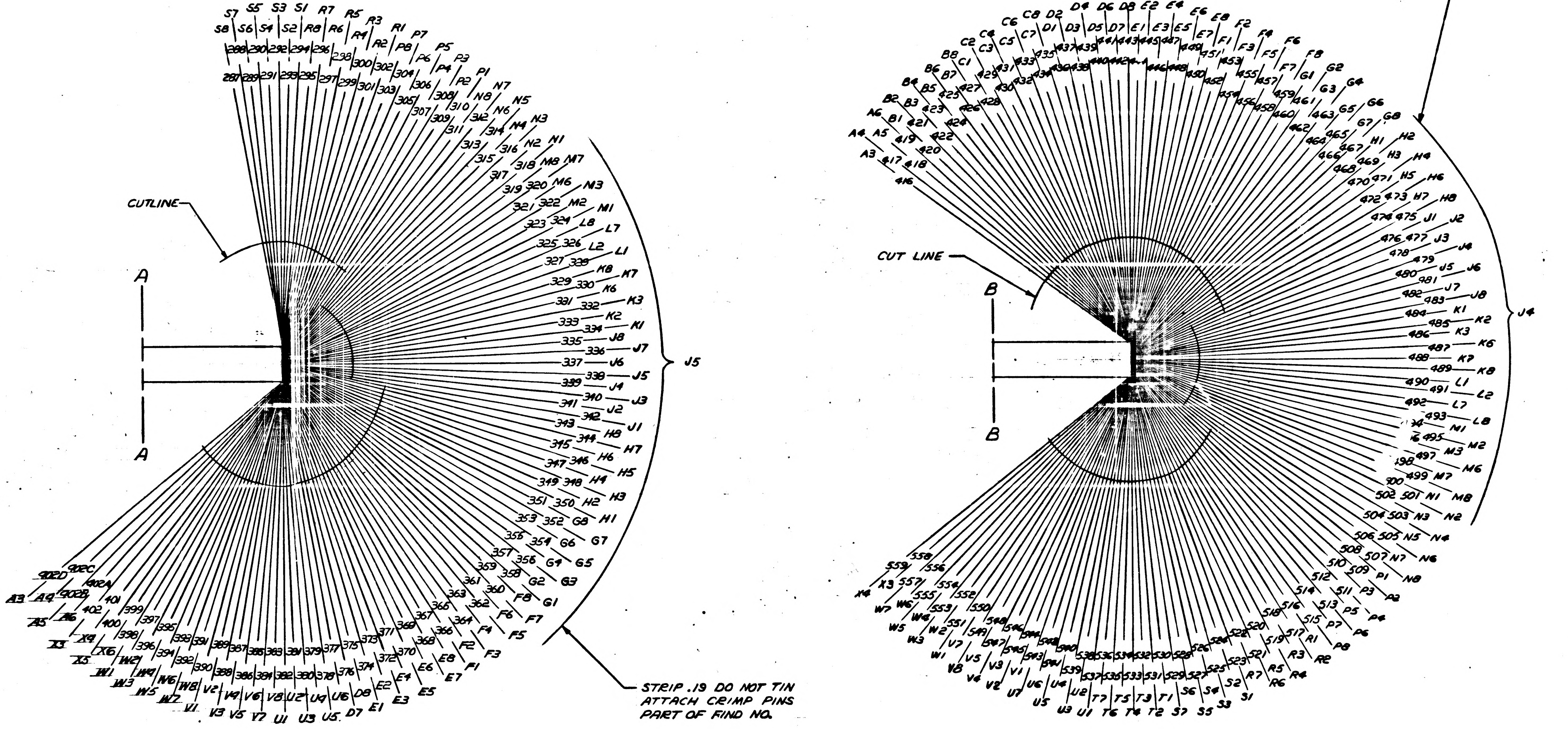
MASTER

1020006

1020006

9000201

SYM	DESCRIPTION	DATE	APPROVED
—	~~CLASS B RELEASED PER TDRR~~		
A	CLASS II CHANGE PER RD R5687 DR John Manning CHK Whitney APPD		
B	CHANGED PER TDRR 06327 DR K Mathy CHK A. Coggins APPD Conley	20 FEB 64	3.2.64



CUTLINE
A
A
J5
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.
CUT LINE
B
B
J4
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 9

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 01307 DATE 10/30/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014380	1014156
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN BB DATE 4 Sep 63
CHECKED A. Coggins 20 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020006
SCALE 1/1
WT
SHEET 2 OF 2

1050003

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5687 DR CHK APPD		
B	CHANGED PER TDRR 06327 DR CHK APPD	20 FEB 64	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	467	ORN	20	2	2	
	2	ORN	22	3	569	
	567	RED	20	1	483	
	568	RED	20	1	475	
	435	BLK	20	4	219	
	443	BLK	20	4	219	
	427	BLK	20	4	219	
	451	BLK	20	4	222	
	8	BLK	22	5	222	ATTACH FIND NO.10
	437	WHT	20	6	220	
	429	WHT	20	6	220	
	421	WHT	20	6	220	
	217	WHT	22	7	270	
	196				271	
	175				259	
	154				260	
	133				261	
	10				404	
	31				406	
	52				406	
	73				407	
	411				223	
	263				221	
	452				8A	
	287				218	
	543				560	
	536				562	
	522				564	
	490				119	
	484				118	
	476				117	
	468				116	
	288				198	
	529				3	
	444				93	
	436				113	
	428				112	
	420				111	
	526				109	
	538				108	
	531				107	
	524				106	
	517				105	
	509				104	
	501				103	
	495				102	
	460				7	
	494				565	
	514				94	
	506				119	
	498				118	
	492				117	
	488				116	
	482				571	
	474				132	
	466				131	
	458				130	
	450				129	
	442				128	
	434				127	
	426				126	
	551				125	
	544				124	
	537				123	
	530				122	
	523				121	
	516				120	
	491				576	
	485				577	
	477				578	
	469				579	
	461				566	
	453				573	
	445				570	
	500	WHT	22	7	563	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	503	WHT	22	7	561	
	558				251	
	559				254	
	422				257	
	423				233	
	553				234	
	554				229	
	555				242	
	556				240	
	546				236	
	547				244	
	548				250	
	233				238	
	539				248	
	540				246	
	541				258	
	525				224	
	518				225	
	519				227	
	520				226	
	521				6	
	515				5	
	527				4	
	528				237	
	532				232	
	533				580	
	534				574	
	535				575	
	542				572	
	416				101	
	417				100	
	418				99	
	419				98	
	424				97	
	425				96	
	430				95	
	431				115	
	432				114	
	433				134	
	438				72	
	439				92	
	440				91	
	441				90	
	446				89	
	447				88	
	448				87	
	449				86	
	454				85	
	455				84	
	456				83	
	457				82	
	459				81	
	462				80	
	463				79	
	464				78	
	465				77	
	470				76	
	471				75	
	472				74	
	473				51	
	478				71	
	479				70	
	480				69	
	481				68	
	486				67	
	487				66	
	489				65	
	493				64	
	496				63	
	497				62	
	499				61	
	502				60	
	503				59	
	504				58	
	505				57	
	507				56	
	510				55	
	511				54	
	512				53	
	513	WHT	22	7	30	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	515	WHT	22	7	50	
	550				49	
	557				48	
	402				47	
	401				46	
	400				45	
	399				44	
	398				43	
	397				42	
	396				41	
	395				40	
	394				39	
	393				38	
	392				37	
	391				36	
	390				35	
	389				34	
	387				32	
	386				9	
	385				29	
	384				28	
	383				27	
	382				26	
	381				25	
	380				24	
	388				33	
	379				23	
	378				22	
	376				20	
	377				21	
	375				19	
	374				18	
	373				17	
	372				16	
	371				15	
	370				14	
	369				13	
	368				12	
	367				11	
	366				153	
	365				152	
	364				151	
	363				150	
	362				149	
	361				148	
	360				147	
	359				146	
	358				145	
	357				144	
	356				143	
	355				142	
	354				141	
	353				140	
	352				139	
	351				138	
	350				137	
	349				136	
	348				135	
	347				155	
	346				174	
	345				173	
	344				172	
	343				171	
	342				170	
	341				169	
	340				168	
	339				167	
	338				166	
	337				165	
	336				164	
	335				163	
	334				162	
	333				161	
	332				160	
	331				159	
	330				158	
	329				157	
	328				156	
	327				176	
	326	WHT	22	7	195	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04134 DATE 10/30/63

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	325	WHT	22	7	194	
	324				193	
	323				192	
	322				191	
	321				190	
	320				189	
	319				188	
	318				187	
	317				186	
	316				185	
	315				184	
	314				183	
	313				182	
	312				181	
	311				180	
	310				179	
	309				178	
	308				177	
	307				197	
	306				216	
	305				215	
	304				214	
	303				213	
	302				212	
	301				211	
	300				210	
	299				209	
	298				208	
	297				207	
	296				206	
	295				205	
	294				204	
	293				203	
	292				202	
	291				201	
	290				200	
	289				199	
	549				6A	
	552	WHT	22	7	6B	
	228	BLK	20	4	402B	
	402C				561A	
	567A	BLK	22	6	402D	
	402A				243	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014380	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.D.Clune DATE 9SEP63
CHECKED A. Cousins 30 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 11/7/63
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

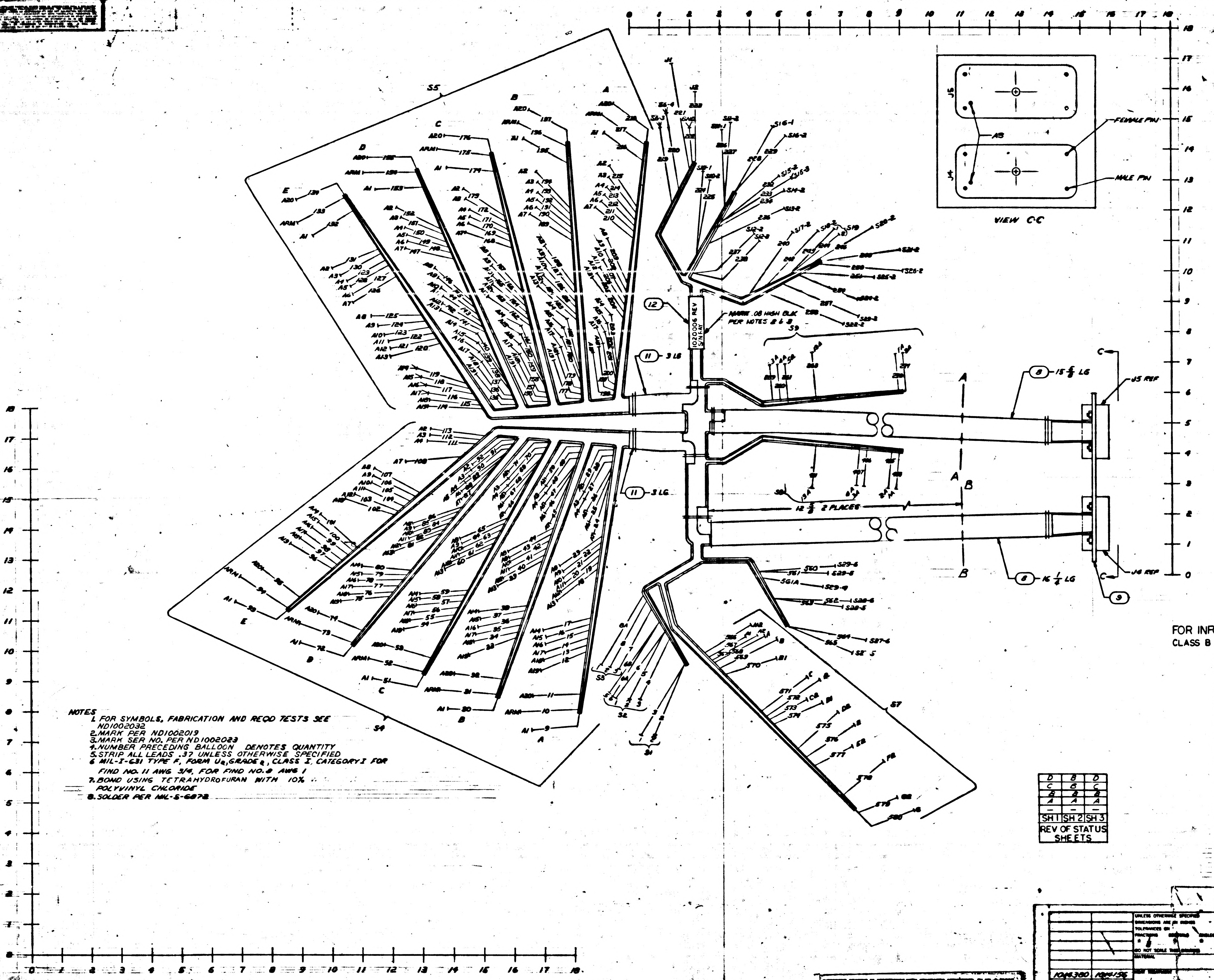
CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020006
SCALE NONE WT SHEET 3 OF 3

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

REV	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5657 DR John Manning CHK J. Williams APPD		
B	CHANGED PER TDRR 06327 DR. K. Muth CHK R. Coppins APPD J. Conboy	20 FEB 64	
C	CLASS II CHANGE PER RD R5850A DR CHK J. C. Joubert APPD G. Marinaro	3-21 64	REB
D	CHANGED PER TDRR 10090 DR J. P. Leonard CHK J. C. Joubert APPD J. Conboy	24 Nov 64	REB



NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK PER ND1002019
3. MARK SER NO. PER ND1002023
4. NUMBER PRECEDING BALLOON DENOTES QUANTITY
5. STRIP ALL LEADS .37 UNLESS OTHERWISE SPECIFIED
6. MIL-I-631 TYPE F, FORM U2, GRADE 2, CLASS I, CATEGORY I FOR FIND NO. 11 AWG 3/4, FOR FIND NO. 8 AWG 1
7. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
8. SOLDER PER MIL-S-6872

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

SH 1	SH 2	SH 3
D	B	D
C	B	C
B	B	B
A	A	A
–	–	–

REV OF STATUS SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
–	1020050	SCHEMATIC	REF
1	1014472-1	BAND MARKER, CABLE	12
A/R	SEE NOTE 6	SLEEVING	11
1	MS25036-5	TERMINAL LUG	10
1	1014408	PLATE, CONN ASSY	9
A/R	SEE NOTE 6	SLEEVING	8
A/R	MIL-W-16878/4 TYPE E 22 WHT	WIRE ELEC,	7
A/R	20 WHT	WIRE, ELEC	6
A/R	22 BLK	WIRE, ELEC	5
A/R	20 BLK	WIRE, ELEC	4
A/R	22 GRN	WIRE, ELEC	3
A/R	20 GRN	WIRE, ELEC	2
A/R	MIL-W-16878/4 TYPE E 20 RED	WIRE, ELEC	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014380	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-4065
DRAWN R.G. Tracy
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1020006
SCALE 1/1
SHEET 1 OF 3

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	467	ORN	20	2	2	
	2	ORN	22	3	569	
	567	RED	20	1	483	
	568	RED	20	1	475	
	435	BLK	20	4	219	
	443	BLK	20	4	219	
	427	BLK	20	4	219	
	451	BLK	20	4	222	
	8	BLK	22	5	222	ATTACH FIND NO.10
	437	WHT	20	6	220	
	429	WHT	20	6	220	
	421	WHT	20	6	220	
	217	WHT	22	7	270	
	196	↑	↑	↑	271	
	175				259	
	154				260	
	133				261	
	10				404	
	31				406	
	52				406	
	73				407	
	411				223	
	263				221	
	452				8A	
	287				218	
	593				560	
	536				562	
	522				564	
	490				119	
	484				118	
	476				117	
	468				116	
	288				198	
	529				3	
	444				93	
	436				113	
	428				112	
	420				111	
	526				5	
	538				108	
	531				107	
	524				106	
	517				105	
	509				104	
	501				103	
	495				102	
	460				7	
	494				565	
	514				94	
	506				119	
	498				118	
	492				117	
	488				116	
	482				571	
	474				132	
	466				131	
	458				130	
	450				129	
	442				128	
	434				127	
	426				126	
	551				125	
	544				124	
	537				123	
	530				122	
	523				121	
	516				120	
	491				576	
	485				577	
	477				578	
	469				579	
	461				566	
	453				573	
	445	↓	↓	↓	570	
	500	WHT	22	7	563	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	508	WHT	22	7	561	
	558	↑	↑	↑	251	
	559				254	
	422				257	
	423				233	
	553				234	
	554				229	
	555				242	
	556				240	
	546				236	
	547				244	
	548				250	
	233				238	
	539				248	
	540				246	
	541				258	
	525				225	
	518				224	
	519				226	
	520				227	
	521				6	
	552				5	
	527				4	
	528				237	
	532				232	
	533				580	
	534				574	
	535				575	
	542				572	
	416				101	
	417				100	
	418				99	
	419				98	
	424				97	
	425				96	
	430				95	
	431				115	
	432				114	
	433				134	
	438				72	
	439				92	
	440				91	
	441				90	
	446				89	
	447				88	
	448				87	
	449				86	
	454				85	
	455				84	
	456				83	
	457				82	
	459				81	
	462				80	
	463				79	
	464				78	
	465				77	
	470				76	
	471				75	
	472				74	
	473				51	
	478				71	
	479				70	
	480				69	
	481				68	
	486				67	
	487				66	
	489				65	
	493				64	
	496				63	
	497				62	
	499				61	
	502				60	
	503				59	
	504				58	
	505				57	
	507				56	
	510				55	
	511				54	
	512	↓	↓	↓	53	
	513	WHT	22	7	30	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	515	WHT	22	7	50	
	550	↑	↑	↑	49	
	557				48	
	402				47	
	401				46	
	400				45	
	399				44	
	398				43	
	397				42	
	396				41	
	395				40	
	394				39	
	393				38	
	392				37	
	391				36	
	390				35	
	389				34	
	387				32	
	386				9	
	385				29	
	384				28	
	383				22	
	382				26	
	381				25	
	380				24	
	388				33	
	379				23	
	378				22	
	376				20	
	377				21	
	375				19	
	374				18	
	373				17	
	372				16	
	371				15	
	370				14	
	369				13	
	368				12	
	367				11	
	366				153	
	365				152	
	364				151	
	363				150	
	362				149	
	361				148	
	360				147	
	359				146	
	358				145	
	357				144	
	356				143	
	355				142	
	354				141	
	353				140	
	352				139	
	351				138	
	350				137	
	349				136	
	348				135	
	347				155	
	346				174	
	345				173	
	344				172	
	343				171	
	342				170	
	341				169	
	340				168	
	339				167	
	338				166	
	337				165	
	336				164	
	335				163	
	334				162	
	333				161	
	332				160	
	331				159	
	330				158	
	329				157	
	328				156	
	327	↓	↓	↓	176	
	326	WHT	22	7	195	

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
–	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5657 DR CHK APPD		
B	CHANGED PER TDRR 06327 DR CHK APPD		
C	CLASS II CHANGE PER RD R5850A DR CHK C. APPD	3-3-64	KEB
D	CHANGED PER TDRR 10090 DR CHK C. APPD		

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO.[illegible] DATE 10/30/63

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	325	WHT	22	7	194	
	324	↑	↑	↑	193	
	323				192	
	322				191	
	321				190	
	320				189	
	319				188	
	318				187	
	317				186	
	316				185	
	315				184	
	314				183	
	313				182	
	312				181	
	311				180	
	310				179	
	309				178	
	308				177	
	307				197	
	306				216	
	305				215	
	304				214	
	303				213	
	302				212	
	301				211	
	300				210	
	299				209	
	298				208	
	297				207	
	296				206	
	295				205	
	294				204	
	293				203	
	292				202	
	291				201	
	290				200	
	289				199	
	549	↓	↓	↓	6A	
	545	WHT	22	7	6B	
	228	BLK	20	4	402B	
	402C	BLK	22	6	561A	
	567A				402D	
	402A				243	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
1014380	1014156
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

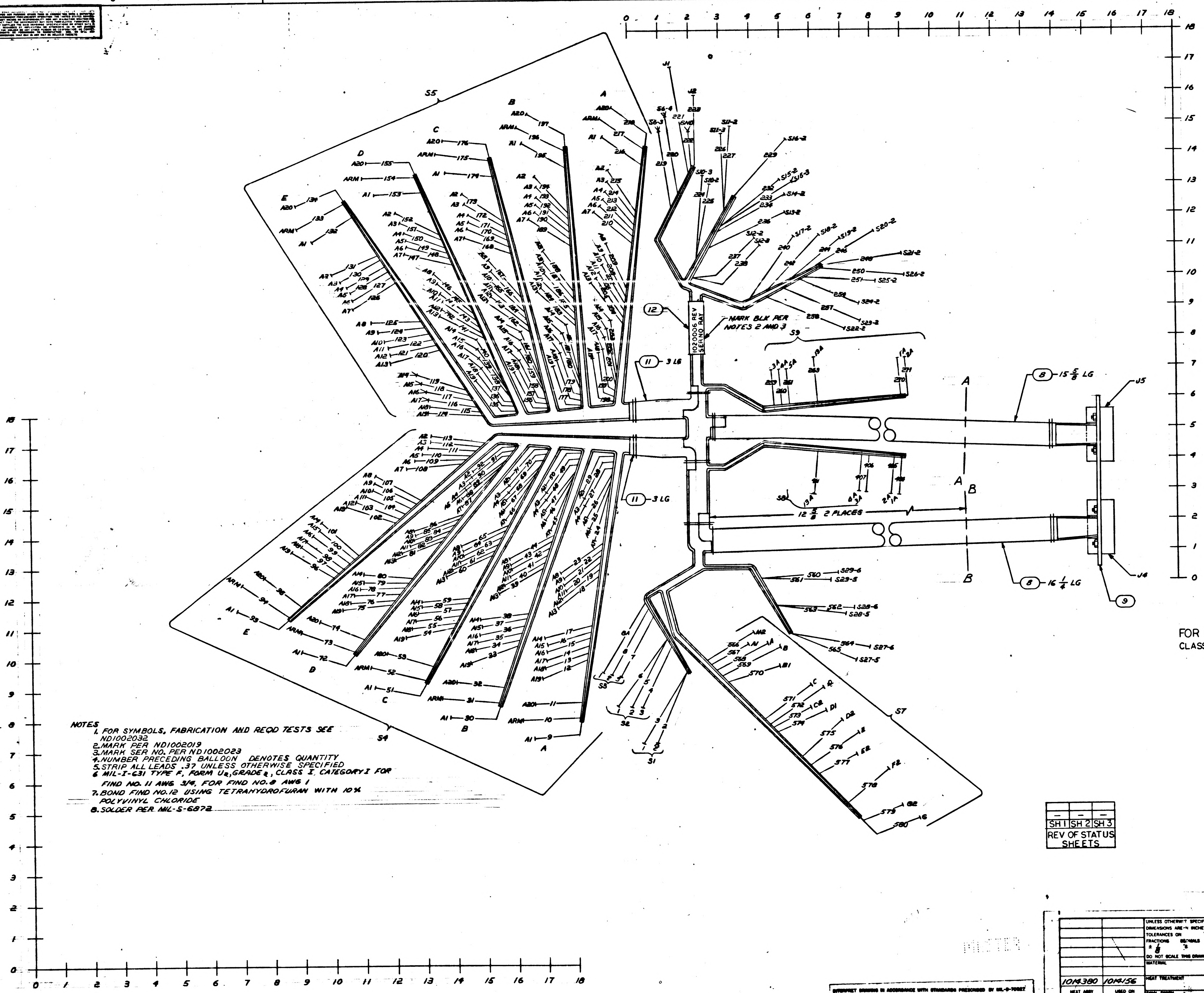
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D.C. DATE 9 SEP 63
CHECKED 30 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
GOVT APPROVAL
GOVT APPROVAL

MANNED SPACECRAFT CENTER,
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020006
SCALE NONE
WT
SHEET 2 OF 3

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		



NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK PER ND1002019
3. MARK SER NO. PER ND1002023
4. NUMBER PRECEDING BALLOON DENOTES QUANTITY
5. STRIP ALL LEADS .37 UNLESS OTHERWISE SPECIFIED
6. MIL-I-631 TYPE F, FORM U_2, GRADE $_2$, CLASS I, CATEGORY I FOR FIND NO. 11 AWG 3/4, FOR FIND NO. 8 AWG 1
7. BOND FIND NO. 12 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
8. SOLDER PER MIL-S-6872

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04/307 DATE 10/30/63

SH 1	SH 2	SH 3
-	-	-

REV OF STATUS SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
-	1020050	SCHEMATIC	REF
1	1014472-2	BAND MARKER	12
A/R	SEE NOTE 6	SLEEVING	11
1	MS25036-5	TERMINAL LUG	10
1	1014408	PLATE, CONN ASSY	9
A/R	SEE NOTE 6	SLEEVING	8
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 22, WHITE	7
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 20, WHITE	6
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 22, BLACK	5
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 20, BLACK	4
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 22, ORANGE	3
A/R	ND1002181, TYPE I, CLASS I	WIRE ELEC, AWG 20, ORANGE	2
A/R	ND1002181 TYPE I, CLASS I	WIRE ELEC, AWG 20, RED	1

LIST OF MATERIALS

1014380	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN P.S. Tracy DATE 8-30-63
CHECKED 30 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

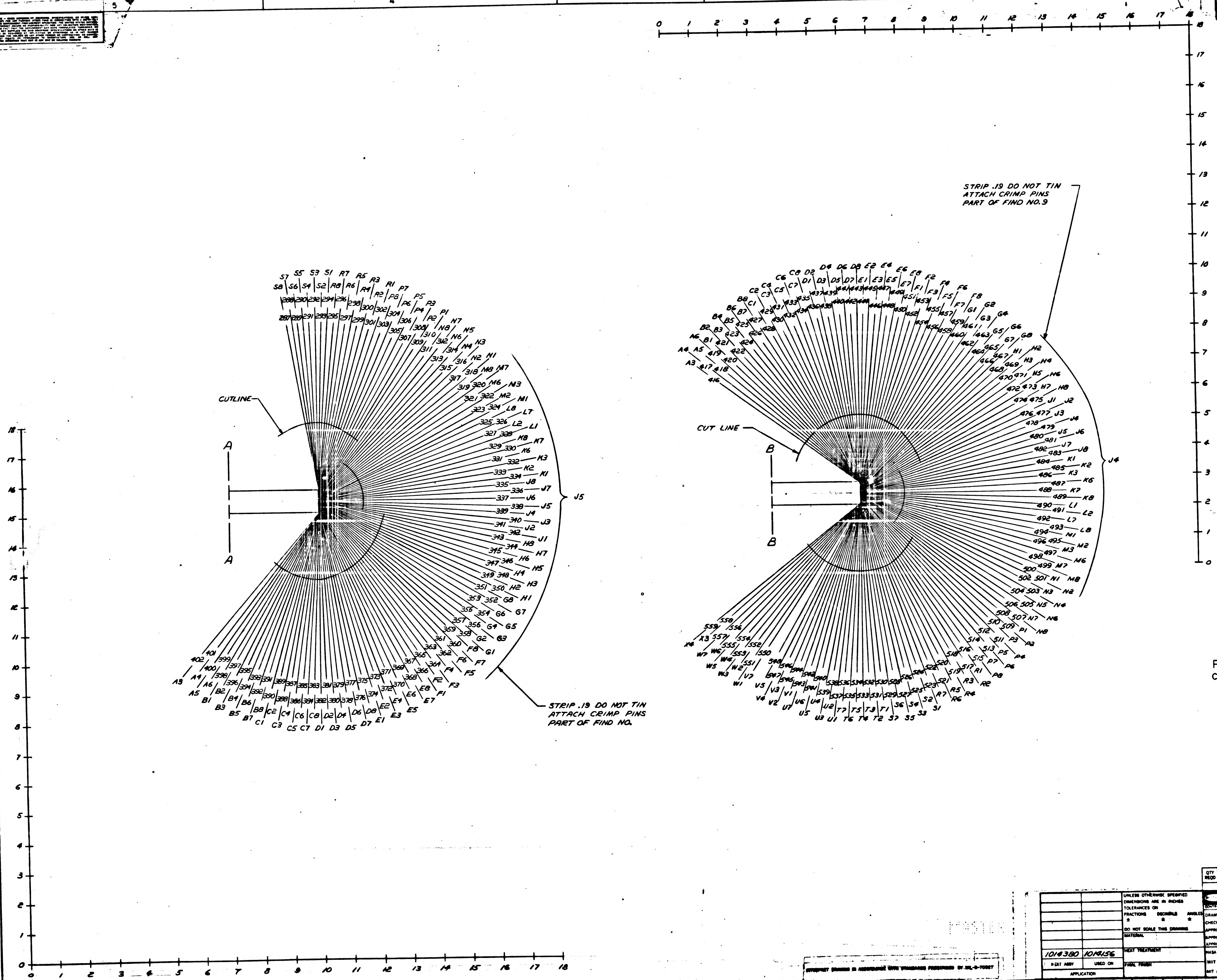
WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020006
SCALE 1/1
WT
SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		



STRIP .19 DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.9

STRIP .19 DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0430; DATE 10/30/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014380	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN BC DATE 4 Sep 63
CHECKED 20 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

CODE IDENT NO. — SIZE J NAS DRAWING NO 1020006
SCALE 1/1 WT SHEET 2 OF 8

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	467	ORN	20	2	2	
	2	ORN	22	3	569	
	567	RED	20	1	475	
	568	RED	20	1	483	
	435	BLK	20	4	219	
	443	BLK	20	4	219	
	427	BLK	20	4	219	
	451	BLK	20	4	222	
	8	BLK	22	5	222	ATTACH FIND NO.10
	437	WHT	20	6	220	
	429	WHT	20	6	220	
	421	WHT	20	6	220	
	217	WHT	22	7	270	
	196				271	
	175				259	
	154				260	
	133				261	
	10				404	
	31				406	
	52				406	
	73				407	
	411				223	
	263				221	
	246				251	
	452				8A	
	234				242	
	287				218	
	254				248	
	240				229	
	508				560	
	500				562	
	494				564	
	490				119	
	484				118	
	476				117	
	468				116	
	288				198	
	529				3	
	444				93	
	436				113	
	428				112	
	420				111	
	552				110	
	545				109	
	538				108	
	531				107	
	524				106	
	517				105	
	509				104	
	501				103	
	495				102	
	460				7	
	522				565	
	514				94	
	506				119	
	498				118	
	492				117	
	488				116	
	482				571	
	474				132	
	466				131	
	458				130	
	450				129	
	442				128	
	434				127	
	426				126	
	551				125	
	544				124	
	537				123	
	530				122	
	523				121	
	516				120	
	491				576	
	485				577	
	477				578	
	469				579	
	461				566	
	453				573	
	445				570	
	536	WHT	22	7	563	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	543	WHT	22	7	561	
	558				251	
	559				254	
	422				257	
	423				233	
	553				234	
	554				229	
	555				242	
	556				246	
	546				236	
	547				244	
	548				250	
	233				238	
	539				248	
	540				246	
	541				258	
	525				224	
	518				225	
	519				227	
	520				226	
	521				6	
	526				5	
	527				4	
	528				237	
	532				232	
	533				580	
	534				574	
	535				575	
	542				572	
	416				101	
	417				100	
	418				99	
	419				98	
	424				97	
	425				96	
	430				95	
	431				115	
	432				114	
	433				134	
	438				72	
	439				92	
	440				91	
	441				90	
	446				89	
	447				88	
	448				87	
	449				86	
	454				85	
	455				84	
	456				83	
	457				82	
	459				81	
	462				80	
	463				79	
	464				78	
	465				77	
	470				76	
	471				75	
	472				74	
	473				51	
	478				71	
	479				70	
	480				69	
	481				68	
	486				67	
	487				66	
	489				65	
	493				64	
	496				63	
	497				62	
	499				61	
	502				60	
	503				59	
	504				58	
	505				57	
	507				56	
	510				55	
	511				54	
	512				53	
	513	WHT	22	7	30	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	515	WHT	22	7	50	
	550				49	
	557				48	
	402				47	
	401				46	
	400				45	
	399				44	
	398				43	
	397				42	
	396				41	
	395				40	
	394				39	
	393				38	
	392				37	
	391				36	
	390				35	
	389				34	
	387				32	
	386				9	
	385				29	
	384				28	
	383				27	
	382				26	
	381				25	
	380				24	
	388				33	
	379				23	
	378				22	
	376				20	
	377				21	
	375				19	
	374				18	
	373				17	
	372				16	
	371				15	
	370				14	
	369				13	
	368				12	
	367				11	
	366				153	
	365				152	
	364				151	
	363				150	
	362				149	
	361				148	
	360				147	
	359				146	
	358				145	
	357				144	
	356				143	
	355				142	
	354				141	
	353				140	
	352				139	
	351				138	
	350				137	
	349				136	
	348				135	
	347				155	
	346				174	
	345				173	
	344				172	
	343				171	
	342				170	
	341				169	
	340				168	
	339				167	
	338				166	
	337				165	
	336				164	
	335				163	
	334				162	
	333				161	
	332				160	
	331				159	
	330				158	
	329				157	
	328				156	
	327				176	
	326	WHT	22	7	195	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO.04307 DATE 10/30/63

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	325	WHT	22	7	194	
	324				193	
	323				192	
	322				191	
	321				190	
	320				189	
	319				188	
	318				187	
	317				186	
	316				185	
	315				184	
	314				183	
	313				182	
	312				181	
	311				180	
	310				179	
	309				178	
	308				177	
	307				197	
	306				216	
	305				215	
	304				214	
	303				213	
	302				212	
	301				211	
	300				210	
	299				209	
	298				208	
	297				207	
	296				206	
	295				205	
	294				204	
	293				203	
	292				202	
	2[illegible]				201	
	290				200	
	289	WHT	22	7	199	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
1014380	1014156
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D.Glenn DATE 9SEP63
CHECKED A. Cosgrove 30 Sept 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

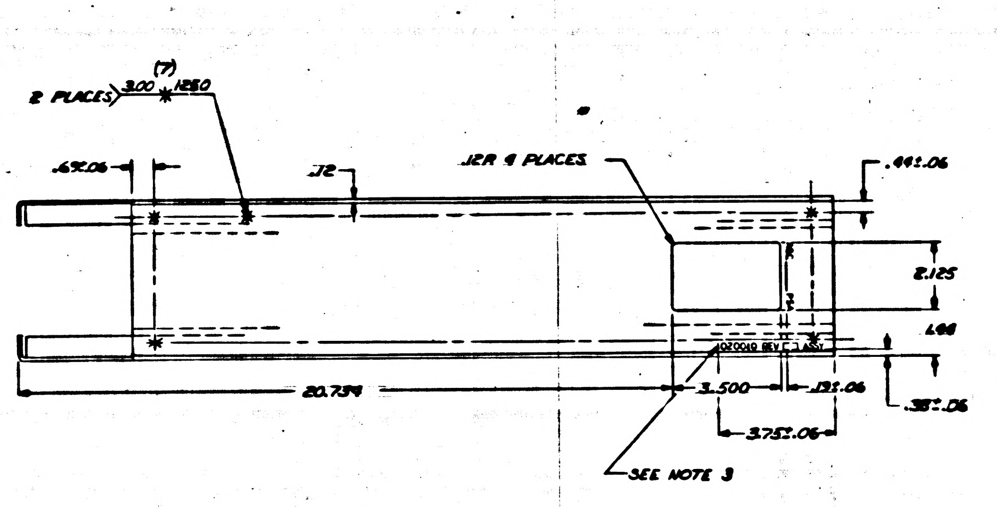
WIRING HARNESS, BRANCHED
SELF TEST
COMPUTER TEST SET

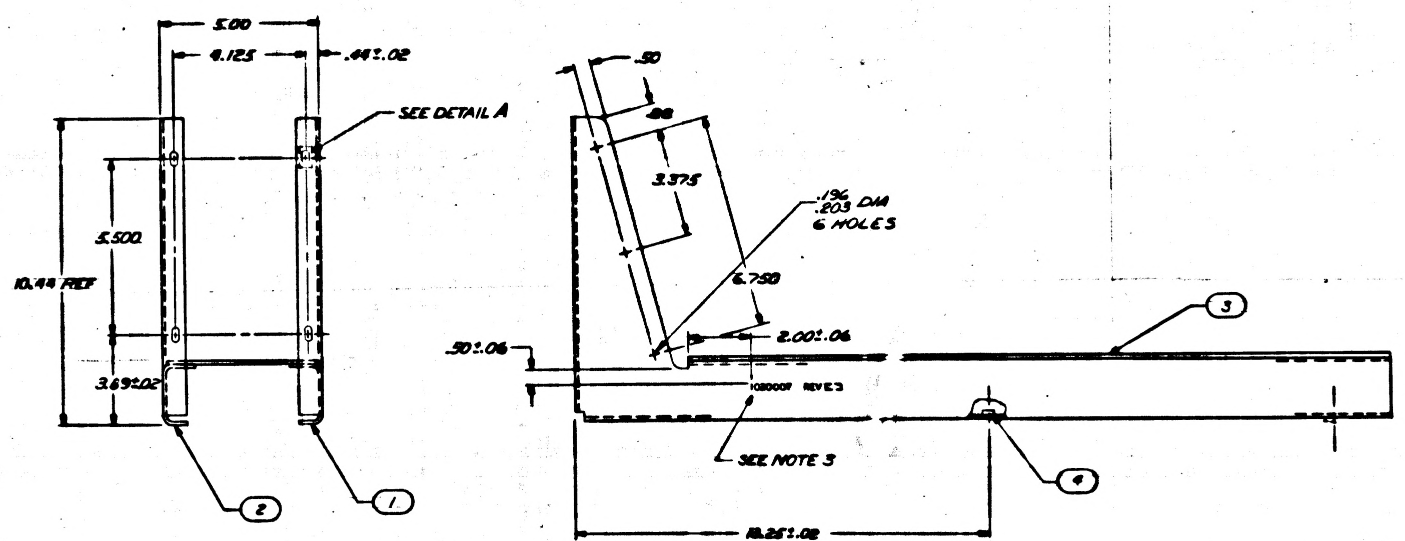
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020006
SCALE NONE
WT
SHEET 3 OF 3

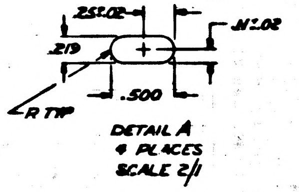
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

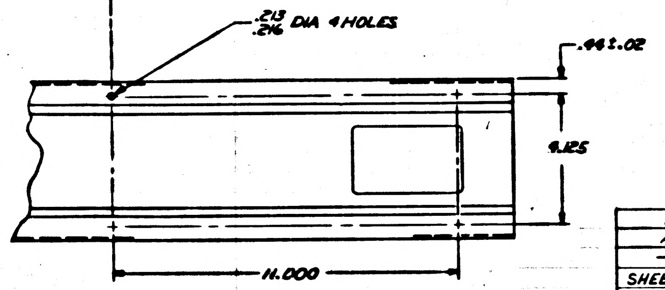
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04135	[illegible]	[illegible]
A	CL II CHANGE PER RDR 5603 DR [illegible] CHK [illegible] APPD [illegible]	27 DEC 63	[illegible]
B	CHANGED PER TDRR 07534 DR [illegible] CHK [illegible] APPD [illegible]	15 APR 64	KEB


2 PLACES
3.00
(7)
.1250
.69±.06
.12
.12R 4 PLACES
.44±.06
2.125
1.88
20.734
3.500
.19±.06
3.75±.06
.38±.06
1020010 REV C ASSY
SEE NOTE 3


5.00
4.125
.44±.02
SEE DETAIL A
5.500
10.44 REF
3.69±.02
2
1
.50
.88
3.375
.196 .203 DIA 6 HOLES
6.750
2.00±.06
.50±.06
3
1020007 REV C 3
SEE NOTE 3
4
18.25±.08


.25±.02
.11±.02
.219
.500
R TYP

DETAIL A
4 PLACES
SCALE 2/1


.213 .216 DIA 4 HOLES
.44±.02
4.125
11.000

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04135 DATE [illegible]

REV STATUS OF PARTS	
PART NO.	REV SYM
1020007-1	B
1020007-2	B
1020007-3	—

NOTES
1. WELD PER MIL-W-6858
2. CHROMATE TREAT PER MIL-C-5541
3. MARK .12 HIGH BLK CHARACTERS PER ND1002019

B	B
A	—
—	—
SHEET 1	SHEET 2
REV STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
4	1006989-15	NUT, PLAIN, SELF CLINCHING	4
1	1020007-3	PLATE	3
1	1020007-2	SIDE, LH	2
1	1020007-1	SIDE, RH	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020010	1019465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.016 ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 15 Jun 63
CHECKED [illegible] 16 SEPT 63
APPROVAL [illegible] 19 OCT 63
APPROVAL [illegible] 4 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

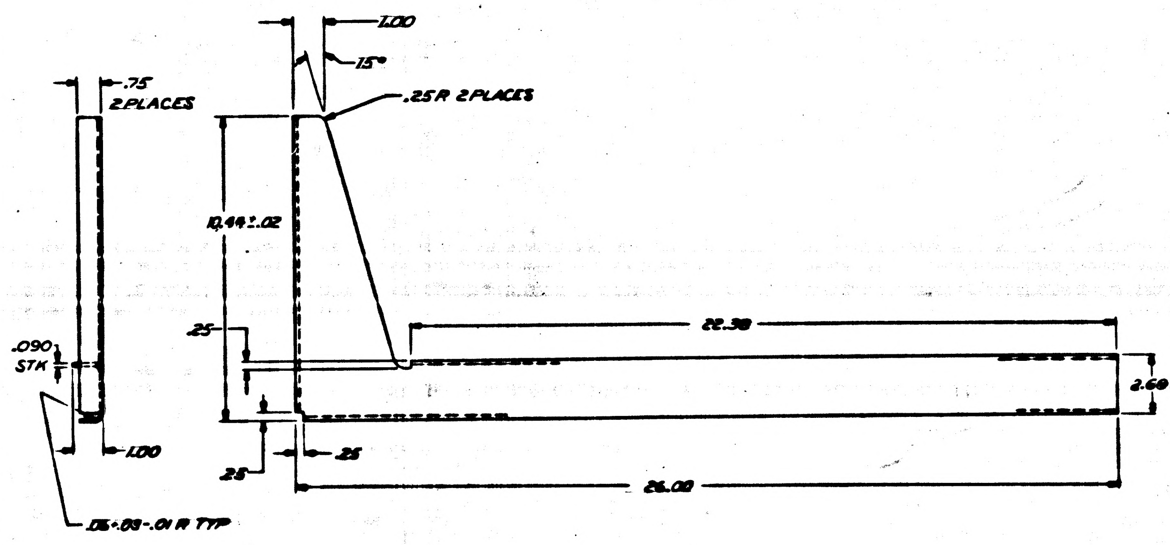
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASING, PROTECTIVE
WIRING HARNESS
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020007
SCALE 1/2
WT
SHEET 1 OF 2

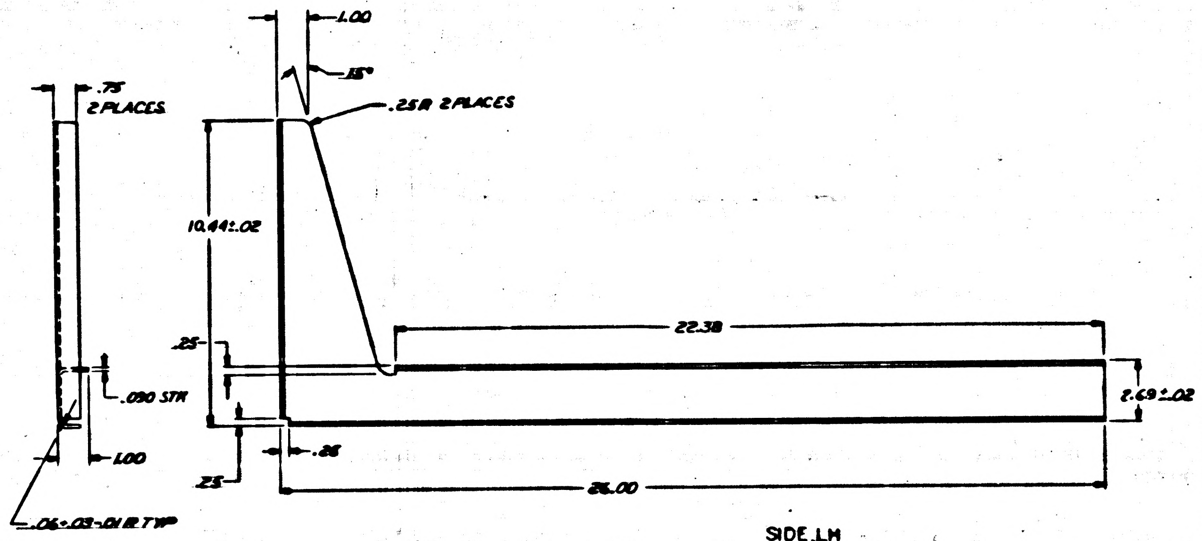
1020007

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327


1.00
15°
.75
2 PLACES
.25 R 2 PLACES
10.44±.02
22.38
.25
.090
STK
2.68±.02
1.00
.25
.25
26.00
.06+.03-.01 R TYP

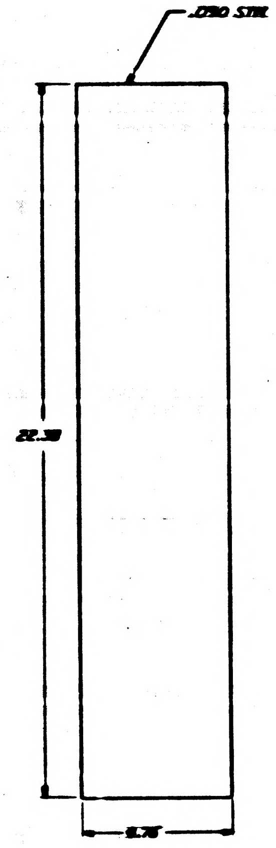
NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES

SIDE, RH
CASING
1020007-1


1.00
15°
.75
2 PLACES
.25 R 2 PLACES
10.44±.02
22.38
.25
.090 STK
2.69±.02
1.00
.25
.25
26.00
.06+.03-.01 R TYP

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES

SIDE, LH
CASING
1020007-2


.090 STK
22.38
5.75

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES

PLATE
1020007-3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 24 Oct 63

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04138	24 Oct 63	4K
B	CHANGE PER TDRR 07534 DR [illegible] CHK [illegible] APPD [illegible]	15 Apr 64	NCB

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1020010	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE 25 Sept 63
CHECKED [illegible] 16 Sept 63
APPROVAL [illegible] 14 Oct 63
APPROVAL [illegible] OCT 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 24 Oct 63
MIT APPROVAL [illegible] 19 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

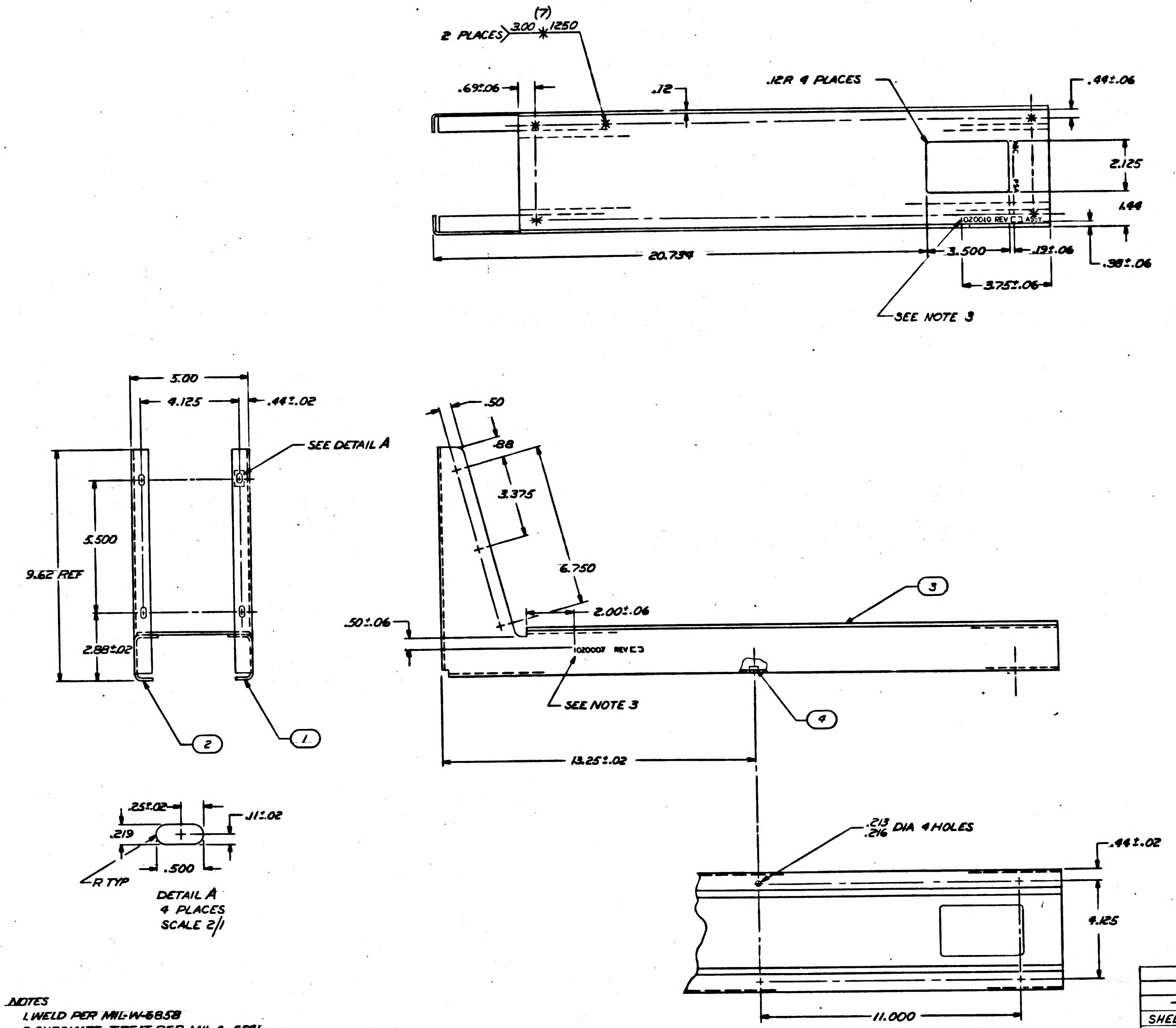
CASING, PROTECTIVE
WIRING HARNESS
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020007
SCALE 1/2
WT
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04138		WR


2 PLACES
(7)
3.00
1250
.69±.06
.12
.12R 4 PLACES
.44±.06
2.125
1.44
.38±.06
1020010 REV [ ] ASSY
20.734
3.500
.19±.06
3.75±.06
SEE NOTE 3
5.00
4.125
.44±.02
SEE DETAIL A
5.500
9.62 REF
2.88±.02
2
1
.50
.88
3.375
6.750
2.00±.06
3
.50±.06
1020007 REV [ ]
SEE NOTE 3
4
13.25±.02
.25±.02
.11±.02
.219
.500
R TYP
DETAIL A
4 PLACES
SCALE 2/1
.213
.216 DIA 4 HOLES
.44±.02
4.125
11.000

NOTES
1. WELD PER MIL-W-6858
2. CHROMATE TREAT PER MIL-C-5541
3. MARK .12 HIGH BLK CHARACTERS PER ND1002019

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 24 [illegible] 63

—	—
SHEET 1	SHEET 2
REV STATUS OF SHEETS	

4	1006989-15	NUT, PLAIN, SELF CLINCHING	4
1	1020007-3	PLATE	3
1	1020007-2	SIDE, LH	2
1	1020007-1	SIDE, RH	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ±.016 ±.03 ANGLES ± DO NOT SCALE THIS DRAWING	RAYTHEON CO. LEXINGTON, MASS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
		MATERIAL	CONTRACT NO. NAS 9-498	
			DRAWN [illegible] DATE 8 Sept 63	CASING, PROTECTIVE WIRING HARNESS AGC/CTS OPERATION CONSOLE
			CHECKED [illegible] 16 SEPT 63	
			APPROVAL [illegible] 19 OCT 63	
			APPROVAL [illegible] 4 Oct 63	
		HEAT TREATMENT	APPROVAL [illegible]	
1020010	1019465		NASA APPROVAL [illegible]	CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020007
NEXT ASSY	USED ON	FINAL FINISH SEE NOTE	MIT APPROVAL [illegible]	
APPLICATION			MIT APPROVAL [illegible]	SCALE 1/2 WT SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020007

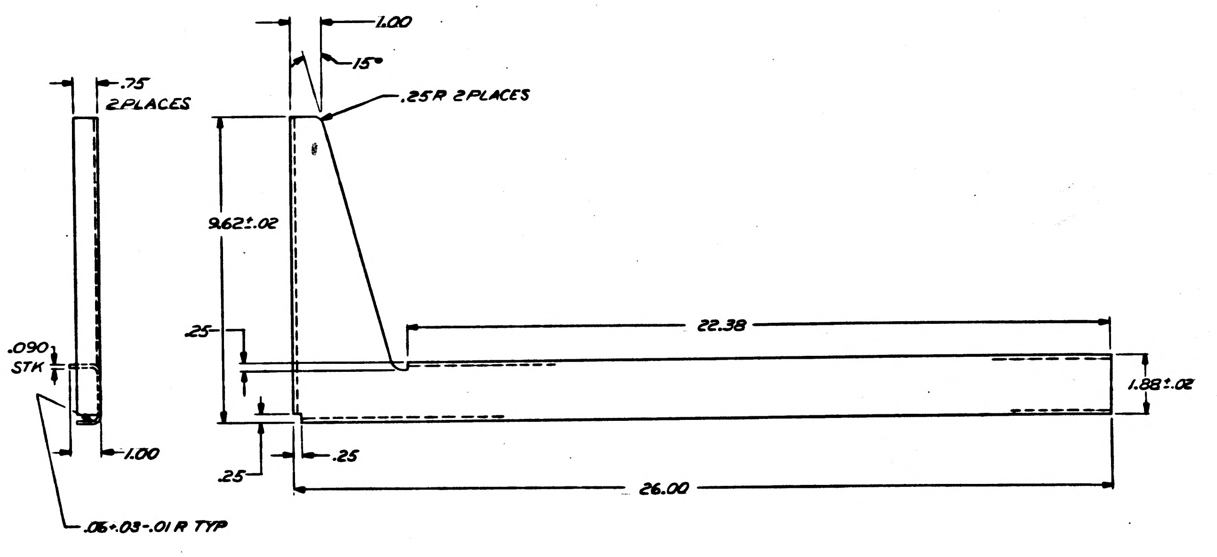
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

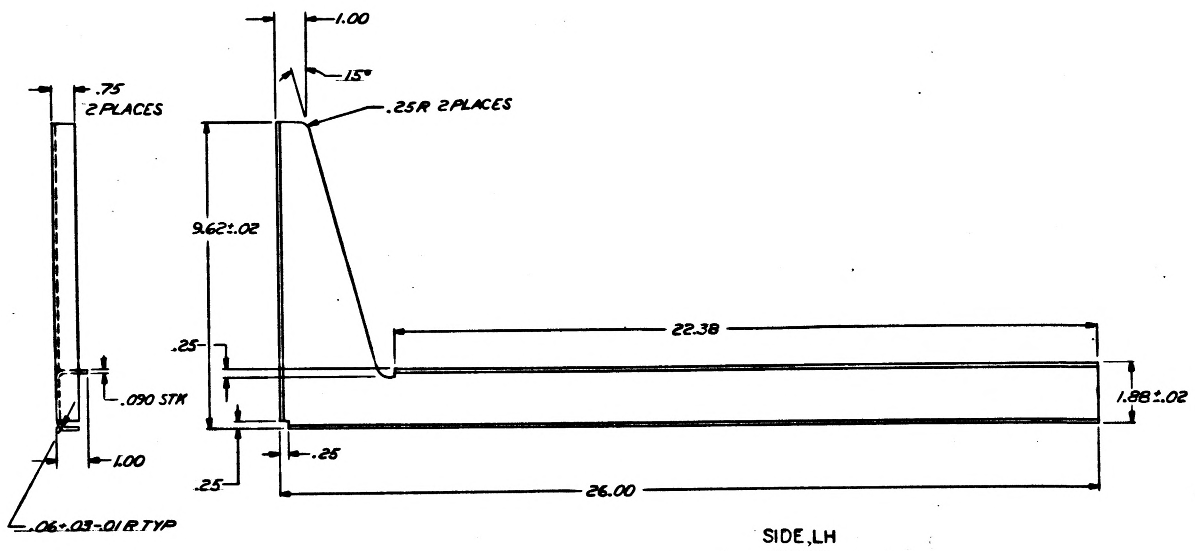
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04138	2-Oct	wk



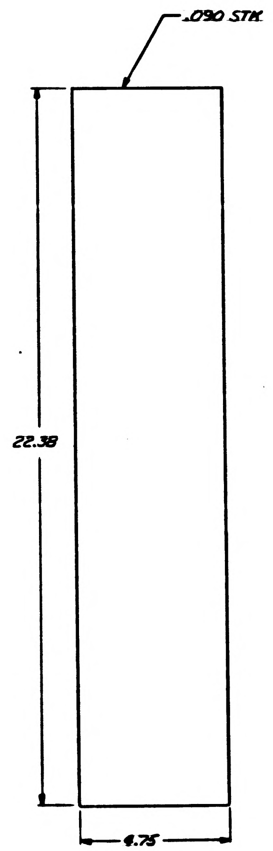
NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES

SIDE, RH
CASING
1020007-1



SIDE, LH
CASING
1020007-2

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES



NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES

PLATE
1020007-3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 24 Oct 63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1020010	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN W. Mabry DATE 3 Sep 63
CHECKED 16 Sept 63
APPROVAL 14 Oct 63
APPROVAL Oct 4
APPROVAL
NASA APPROVAL
MIT APPROVAL 24 Oct 63
MIT APPROVAL 10/4/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASING, PROTECTIVE
WIRING HARNESS
AGC/CTS OPERATION CONSOLE

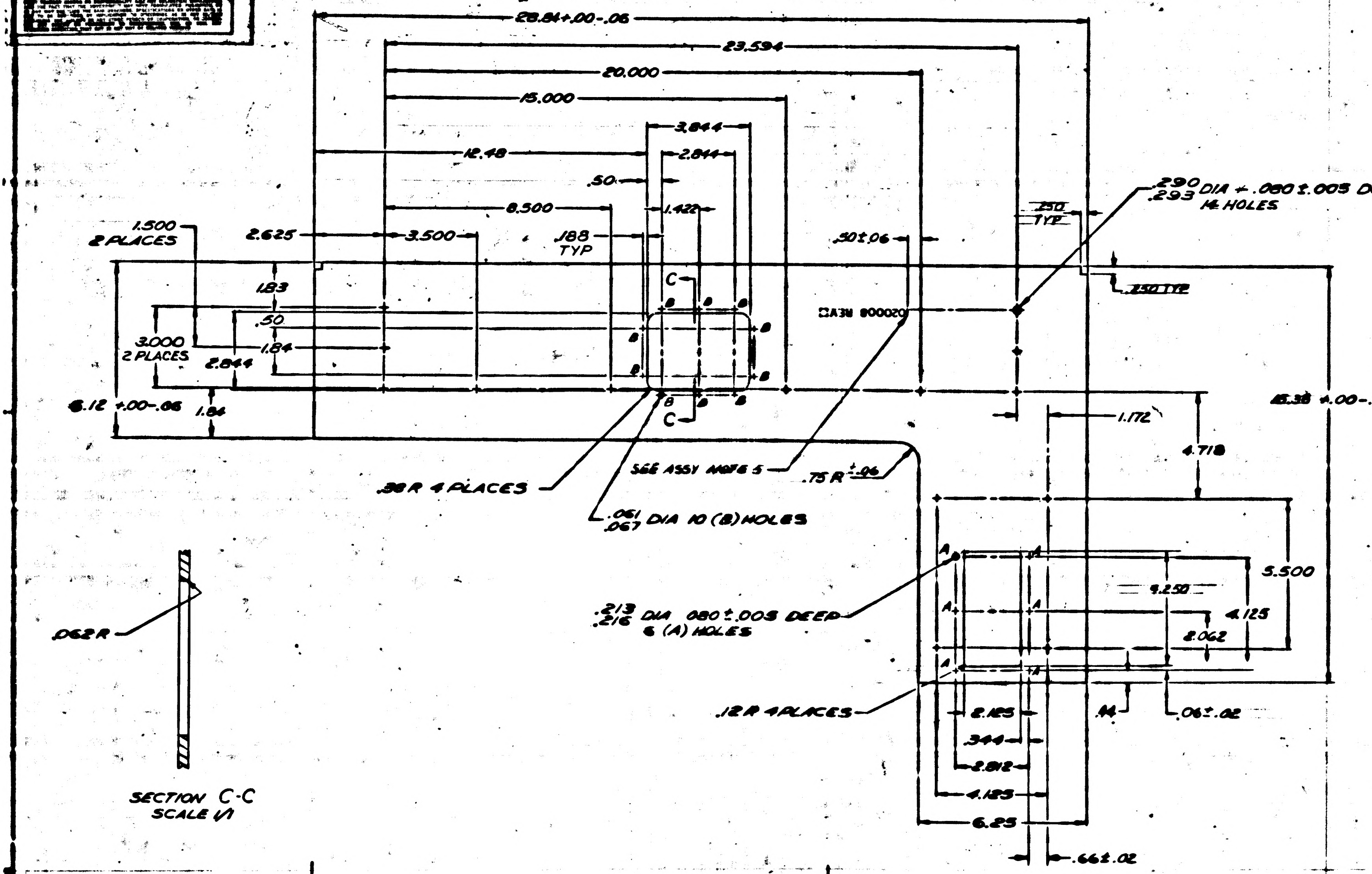
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020007
SCALE 1/2
WT
SHEET 2 OF 2

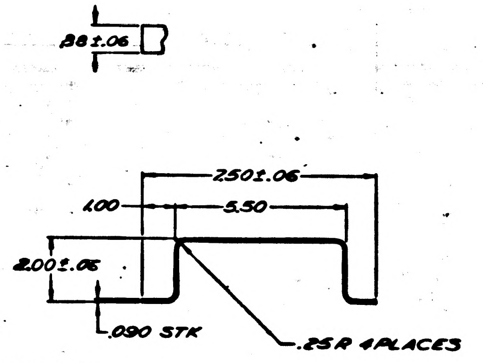
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020007

INCHES
PHOTOGRAPHIC SCALE ONLY

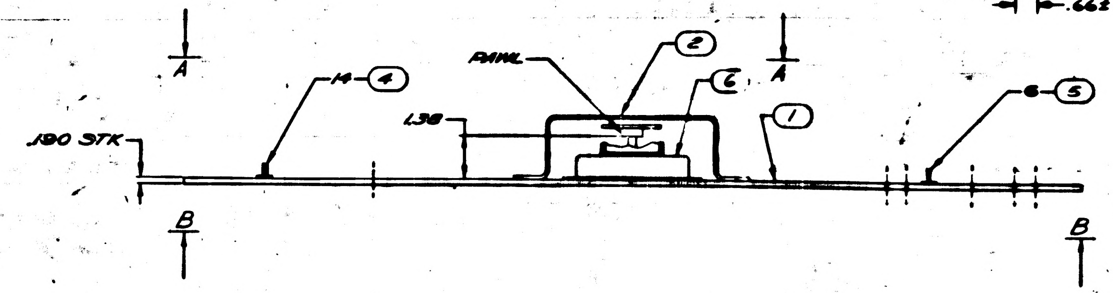
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]
A	CHANGED PER TDRR 10085 DR S.T. [illegible] CHK C. [illegible] APPD [illegible]	[illegible] 64	[illegible]

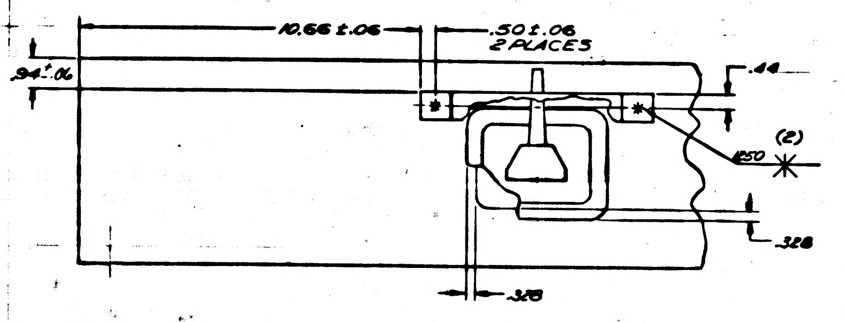

28.84+.00-.06
23.594
20.000
15.000
12.48
3.844
2.844
.50
1.422
8.500
3.500
2.625
1.500
2 PLACES
.188
TYP
1.83
.50
1.84
3.000
2 PLACES
2.844
6.12 +.00-.06
1.84
C
C
B
.50±.06
1020008 REV □
.250
TYP
.250 TYP
.290
.293 DIA +.080±.005 DEEP
14 HOLES
15.38 +.00-.06
1.172
4.718
.38 R 4 PLACES
SEE ASSY NOTE 5
.75 R ±.06
.061
.067 DIA 10 (B) HOLES
A
5.500
4.250
4.125
2.062
.213
.216 DIA .080±.005 DEEP
6 (A) HOLES
.12 R 4 PLACES
2.125
.344
2.812
4.125
6.25
.14
.06±.02
.66±.02
.062 R
SECTION C-C
SCALE 1/1


.88±.06
2.50±.06
1.00
5.50
2.00±.06
.090 STK
.25 R 4 PLACES

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. REMOVE BURRS & SHARP EDGES

BRACKET
1020008-2

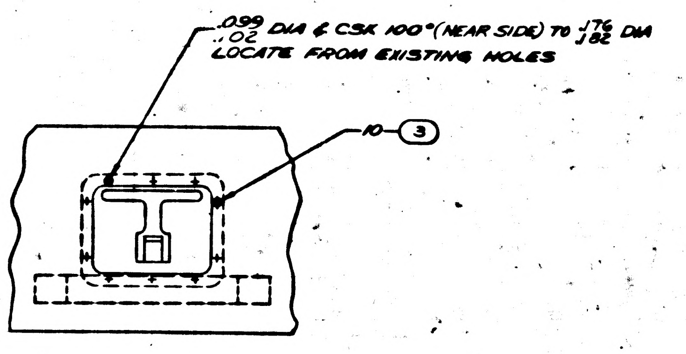

A
A
B
B
PAWL
2
14
4
6
1
6
5
1.38
.190 STK

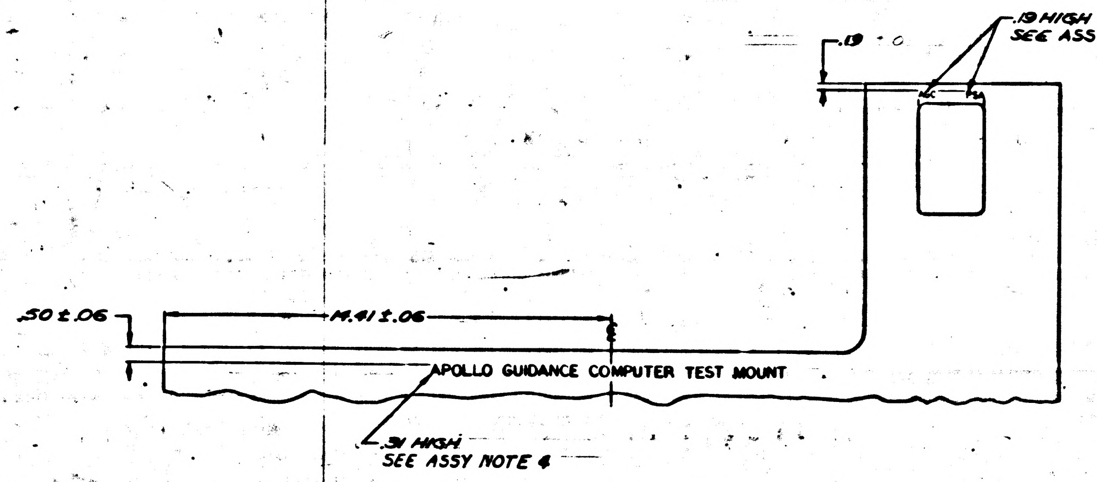

10.66±.06
.50±.06
2 PLACES
.94±.06
.44
.250
(2)
.328
.328

PARTIAL VIEW A-A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE [illegible]

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020008-1	A
1020008-2	—


.099
.102 DIA & CSK 100° (NEAR SIDE) TO .176
.182 DIA
LOCATE FROM EXISTING HOLES
10
3


.19 HIGH
SEE ASSY NOTE 4
.19
.50±.06
14.41±.06
APOLLO GUIDANCE COMPUTER TEST MOUNT
.31 HIGH
SEE ASSY NOTE 4

PARTIAL VIEW B-B

①

1. MATL: AL 6061-T6 PER QQ-A-327
2. REMOVE BURRS AND SHARP EDGES

ASSY NOTES
1. ~~SPOT WELD PER MIL-W-6858~~
2. CHROMATE TREAT PER MIL-C-5541
3. MASK EXPOSED AREA OF FIND NO. 6 & PAINT FRONT & EDGES 1 COAT TT-E-529, CLASS B, FED-STD-595, COLOR NO. 26440 PER MIL-F-14072, PS13, TYPE II
4. SILK SCREEN BLACK PER ND1002019
5. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	1006675	FASTENER, ADJUS. PAWL, RECESSED	6
6	1006951-003	STUD	5
14	1006951-007	STUD	4
10	MS20426AD3-7	RIVET, CSK HEAD	3
1	1020008-2	BRACKET	2
1	1020008-1	PANEL	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020010	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.010 .02 ANGLES [illegible]
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE
HEAT TREATMENT
FINAL PROTECT
SEE NOTE

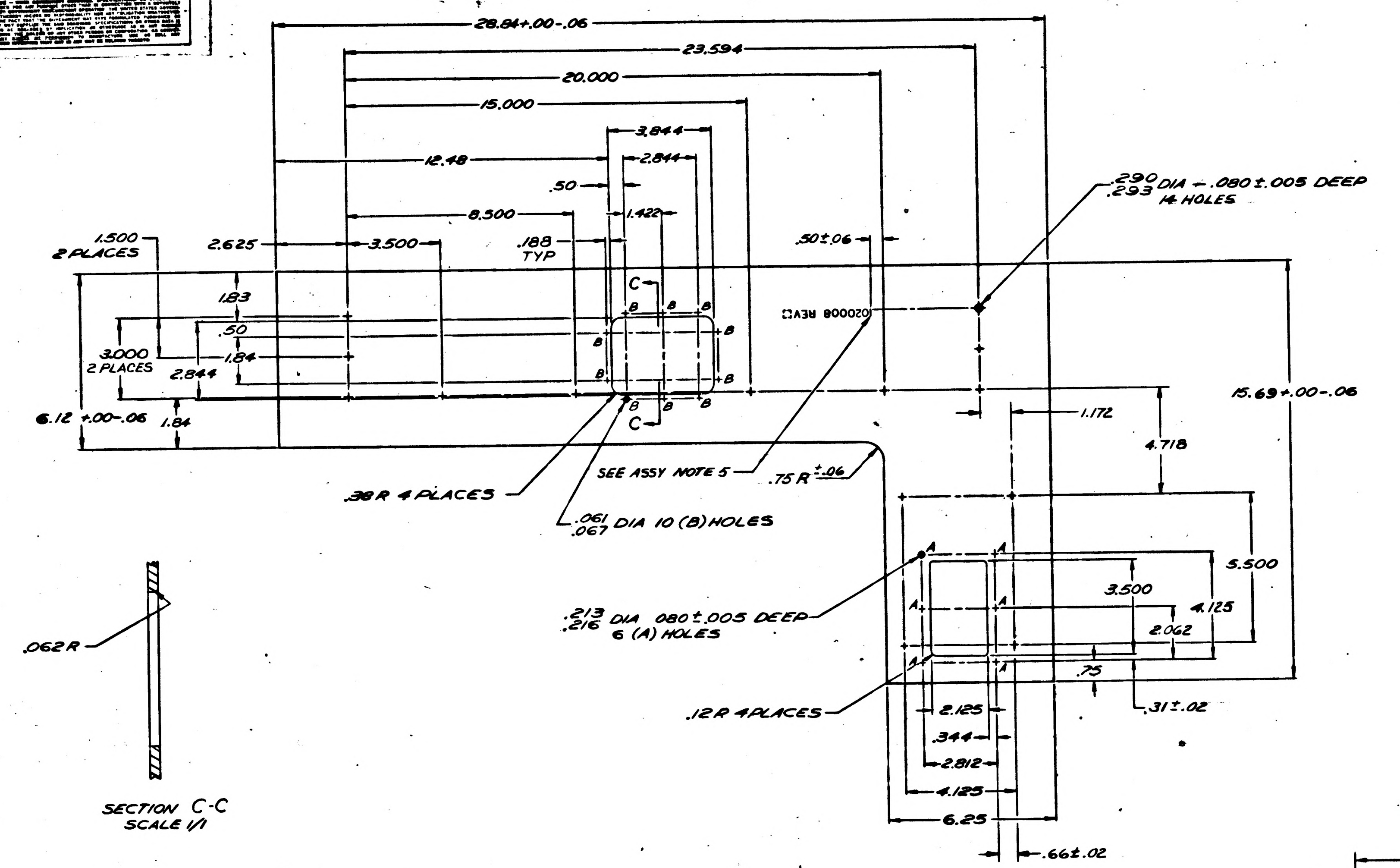
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-497

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

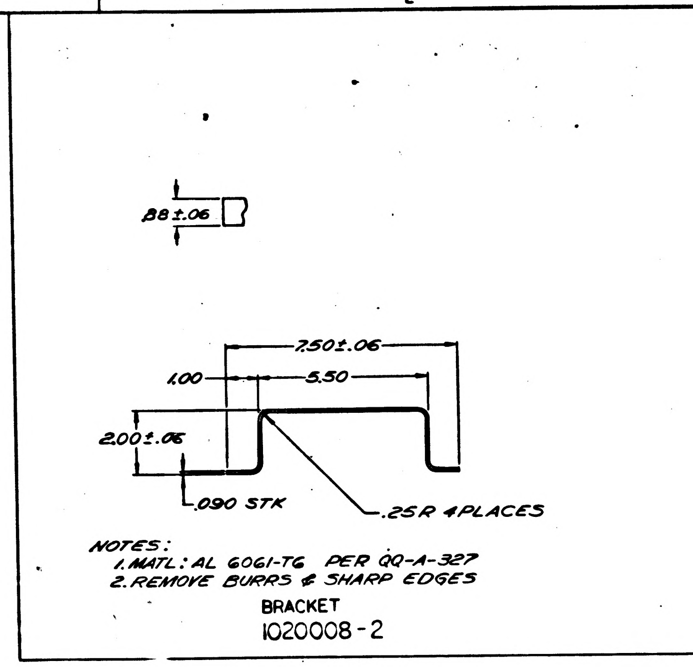
PANEL
AGC/CTS OPERATION CONSOLE

1020008
SCALE 1/2
SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03596		



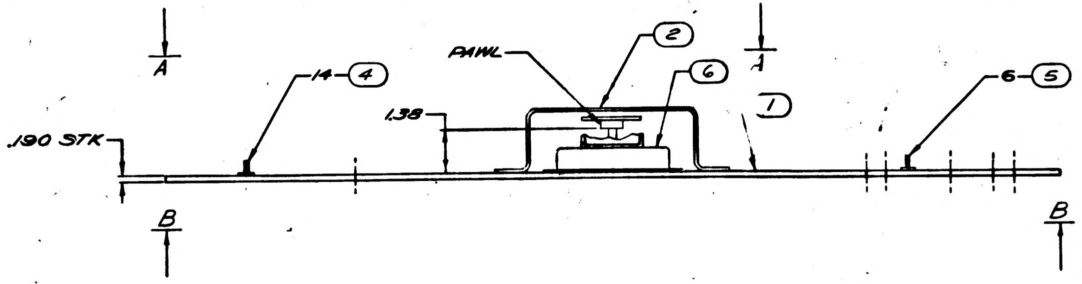
28.84+.00-.06
23.594
20.000
15.000
3.844
2.844
1.422
12.48
.50
8.500
.188 TYP
1.500 2 PLACES
2.625
3.500
1.83
.50
3.000 2 PLACES
1.84
2.844
6.12 +.00-.06
1.84
C
B
.50±.06
1020008 REV
.290 .293 DIA - .080±.005 DEEP 14 HOLES
15.69+.00-.06
1.172
4.718
.38R 4 PLACES
SEE ASSY NOTE 5
.75R ±.06
.061 .067 DIA 10 (B) HOLES
A
5.500
3.500
4.125
2.062
.213 .216 DIA .080±.005 DEEP 6 (A) HOLES
.75
.31±.02
.12R 4 PLACES
2.125
.344
2.812
4.125
6.25
.66±.02
.062R
SECTION C-C SCALE 1/1



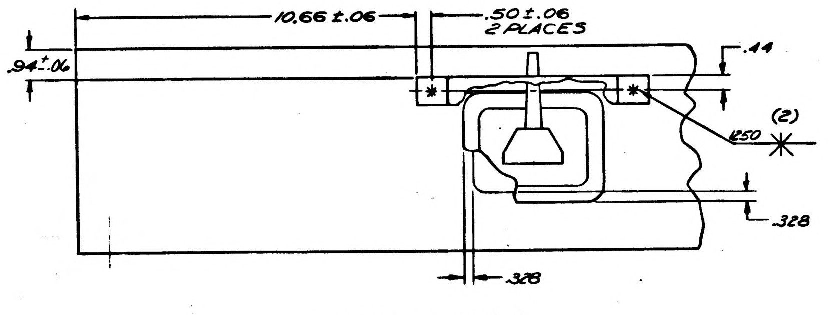
.88±.06
7.50±.06
1.00
5.50
2.00±.06
.090 STK
.25R 4 PLACES

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. REMOVE BURRS & SHARP EDGES

BRACKET
1020008-2



A
PAWL
2
14-4
6
1
6-5
1.38
.190 STK
B
B

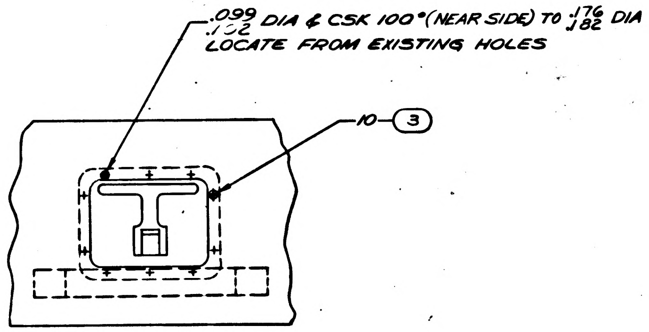


10.66±.06
.50±.06 2 PLACES
.94±.06
.44
.250
(2)
.328
.328

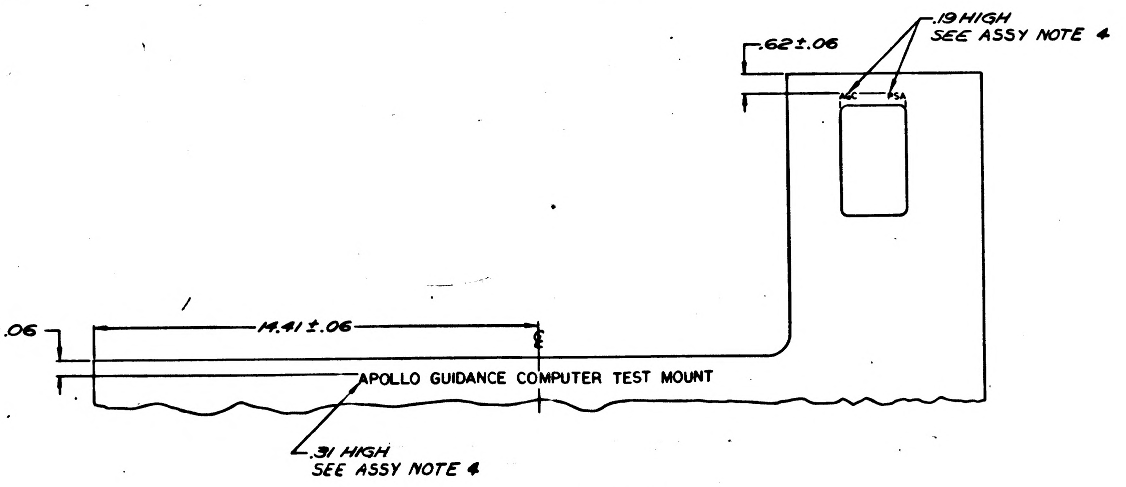
PARTIAL VIEW A-A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03596 DATE 11/17/63

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020008-1	—
1020008-2	—



.099 .102 DIA & CSK 100° (NEAR SIDE) TO .176 .182 DIA LOCATE FROM EXISTING HOLES
10-3



.62±.06
.19 HIGH SEE ASSY NOTE 4
.50±.06
14.41±.06
APOLLO GUIDANCE COMPUTER TEST MOUNT
.31 HIGH SEE ASSY NOTE 4

PARTIAL VIEW B-B

①
1. MATL: AL 6061-T6 PER QQ-A-327
2. REMOVE BURRS AND SHARP EDGES

ASSY NOTES
1. SPOT WELD PER MIL-W-6858
2. CHROMATE TREAT PER MIL-C-5541
3. MASK EXPOSED AREA OF FIND NO.6 & PAINT FRONT & EDGES 1 COAT TT-E-529, CLASS B, FED-STD-595, COLOR NO. 26440 PER MIL-F-14072, P513, TYPE II
4. SILK SCREEN BLACK PER ND1002019
5. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	1006675	FASTENER, ADJUS. PAWL, RECESSED	6
6	1006951-003	STUD	5
14	1006951-007	STUD	4
10	MS20426AD3-7	RIVET, CSK HEAD	3
1	1020008-2	BRACKET	2
1	1020008-1	PANEL	1

LIST OF MATERIALS

1020010	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.016 .03 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN
CHECKED
APPROVAL 4 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PANEL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020008
SCALE 1/2
WT
SHEET 1 OF 1

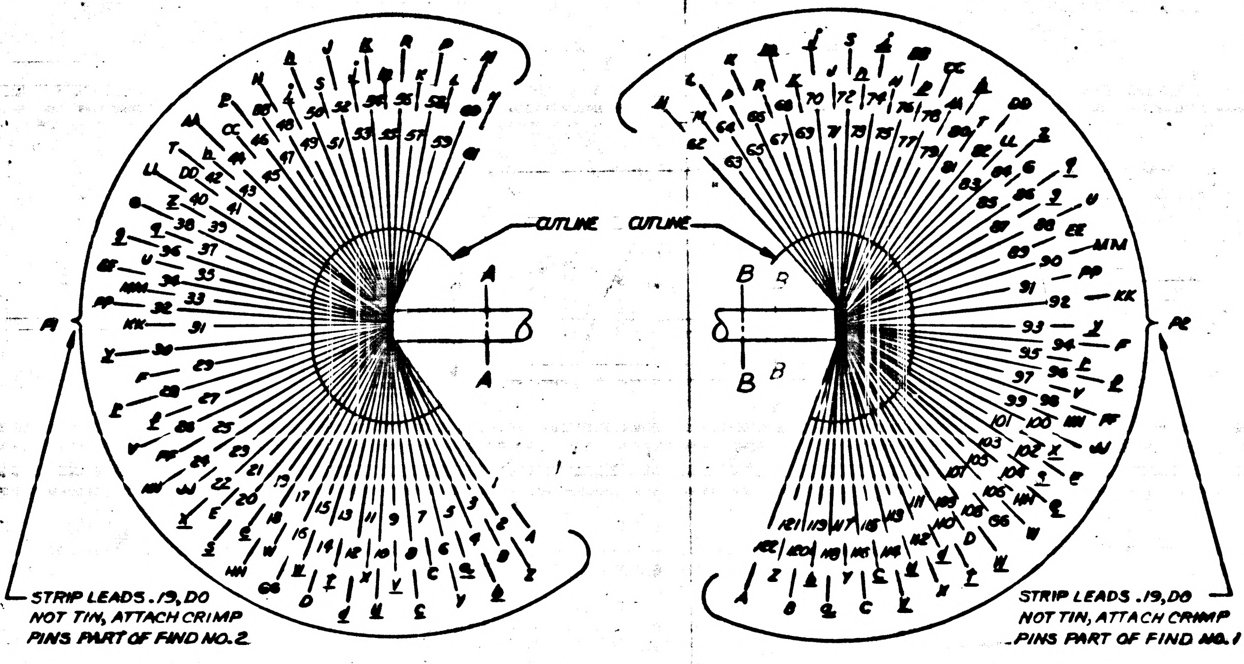
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

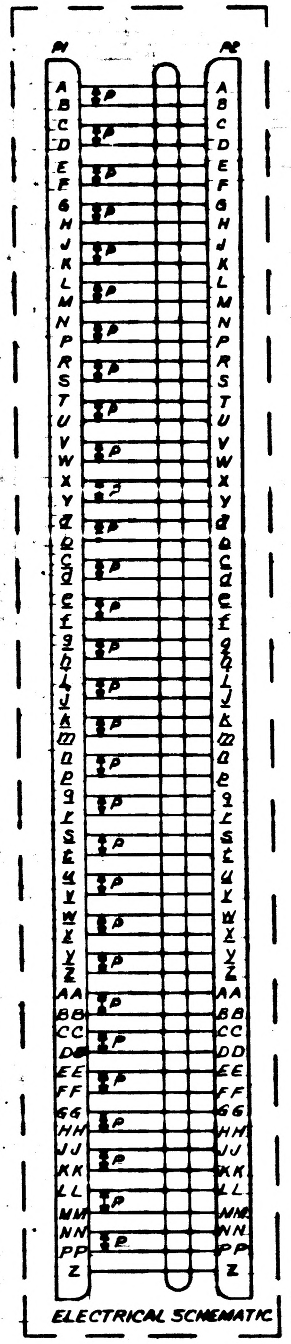
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
	~~CCB RELEASED PER TDRR~~		
A	CHANGED PER TDRR 07240 DR. W Crane CHK APPD.	MAR 64	

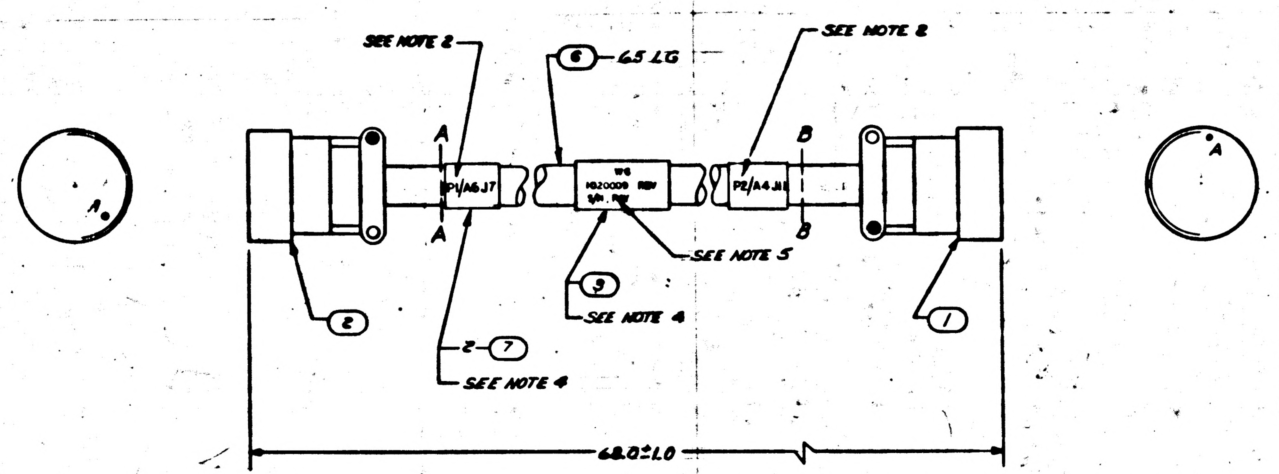
ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION				
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			65	
	56	BLK	22	5	67	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	6	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			35	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	26	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


P1
P2
CUTLINE
CUTLINE
A
A
B
B
STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO. 2
STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO. 1


P1
P2
A B C D E F G H J K L M N P R S T U V W X Y Z
AA BB CC DD EE FF GG HH JJ KK LL MM NN PP
TP

ELECTRICAL SCHEMATIC


SEE NOTE 2
SEE NOTE 2
6
6.5 LG
P1/A6J7
P2/A4J1
1020009 REV
SEE NOTE 5
3
SEE NOTE 4
2
2-7
SEE NOTE 4
1
A
A
B
B
68.0±1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U II, GRADE II, CLASS I, CATEGORY I, FOR FIND NO. 6 AWG 5/8
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE.
5. MARK .08 HIGH BLACK PER ND1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-42	BAND MARKER, CABLE	7
AR	SEE NOTE 3	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	MIL-W-16878/4 TYPE E 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61P	CONNECTOR	2
1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-[illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

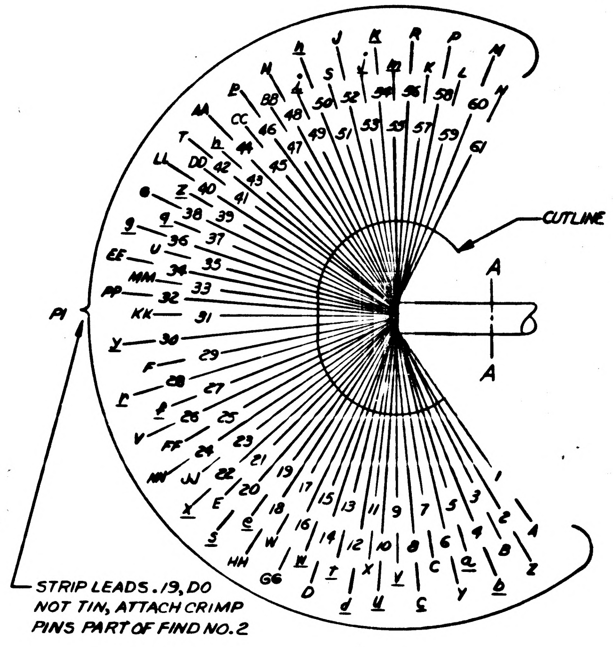
CABLE ASSEMBLY
I/FG
MSC/CTS OPERATION CONSOLE

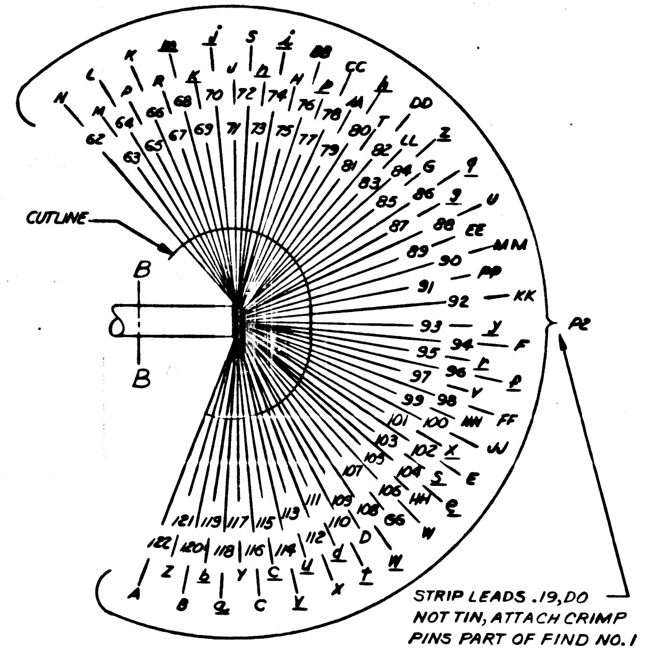
SIZE J
1020009
SCALE 1/1

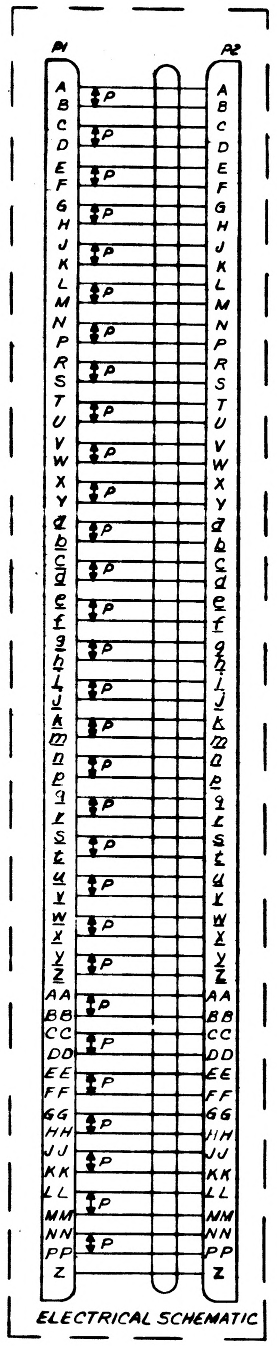
SYM	DESCRIPTION	DATE	APPROVED
—	~~CCB RELEASED PER TDRR 04135~~		
A	CHANGED PER TDRR 07240 DR. W Brown CHK APPD	MAR 64	
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18942 DR R Burt CHK K. Martin APPD	30 June 65	

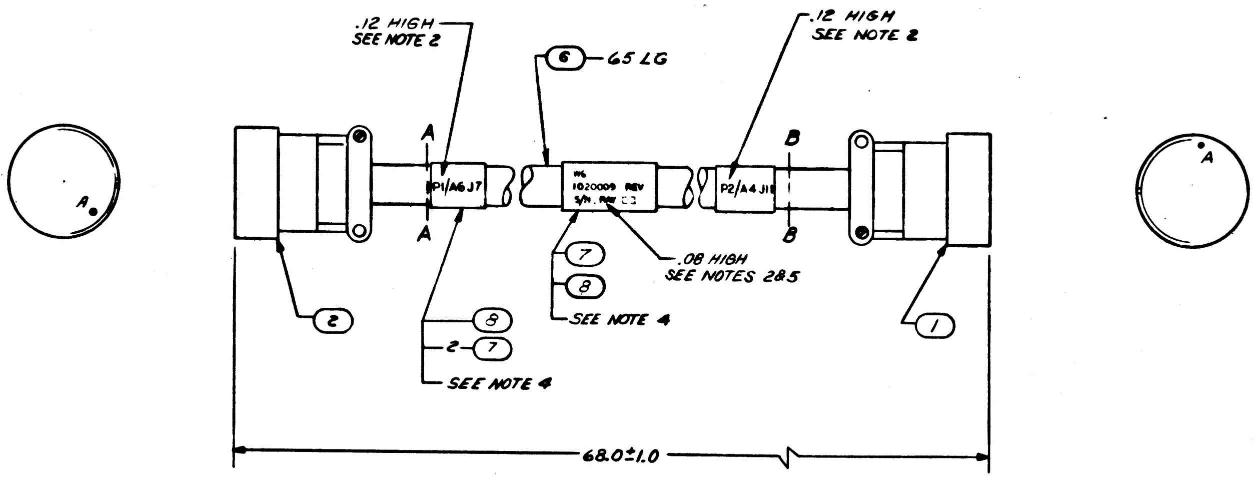
ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION				
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			65	
	56	BLK	22	5	67	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	5	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			95	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	25	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


P1
CUTLINE
A
A
STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO. 2


P2
CUTLINE
B
B
STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO. 1


P1
P2
ELECTRICAL SCHEMATIC


.12 HIGH SEE NOTE 2
6
65 LG
.12 HIGH SEE NOTE 2
A
A
B
B
P1/A6 J7
W6 1020009 REV S/N. REV
P2/A4 J11
7
8
.08 HIGH SEE NOTES 2&5
SEE NOTE 4
2
8
2
7
SEE NOTE 4
1
68.0±1.0
A
A

NOTES:
1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. MIL-I-631 TYPE F, FORM U II, GRADE II, CLASS I, CATEGORY I, FOR FIND NO.6 AWG 5/8
4. BOND USING FIND NO.8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	8
	3	1019972-9A	BAND MARKER, CABLE	7
*	55	SEE NOTE 3	SLEEVING	6
*	165	1014341-11	WIRE, ELECTRICAL	5
*	5.5	MIL W-16878/4, TYPE E, 22 BLK	WIRE, ELECTRICAL	4
	~~1~~	~~1019972-~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-24-61P	CONNECTOR	2
	1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

1014465
APPLICATION

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

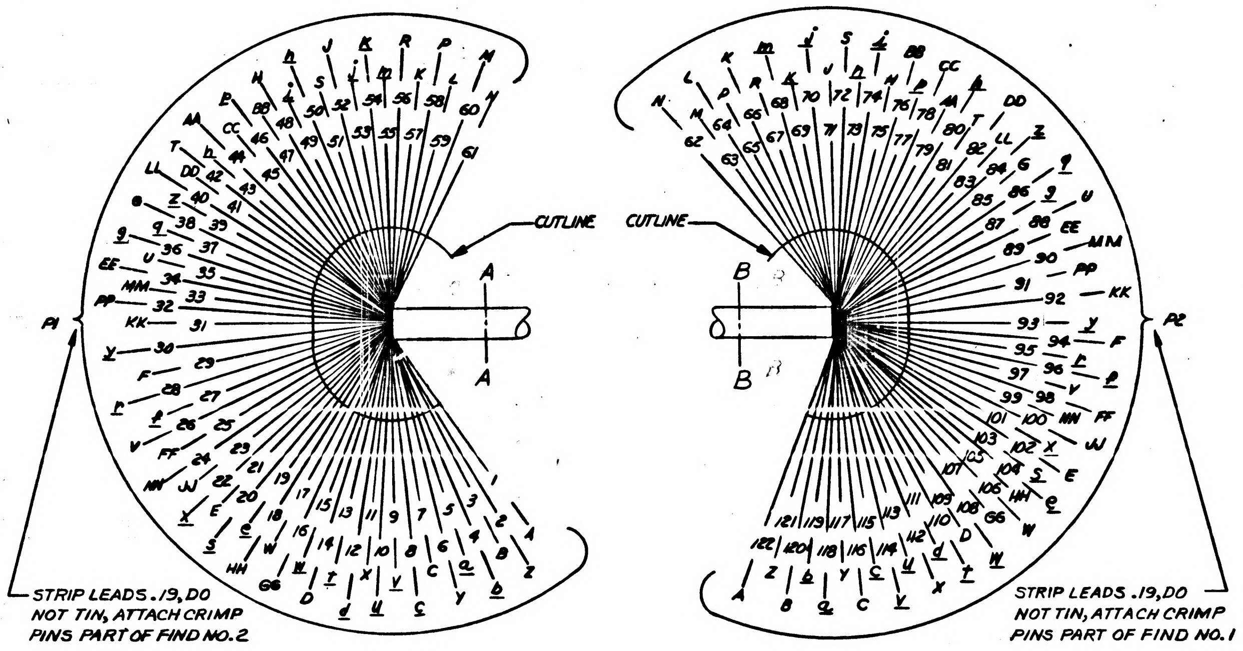
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

CABLE ASSEMBLY
W6
OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020009
SCALE 1/1
SHEET 1 OF

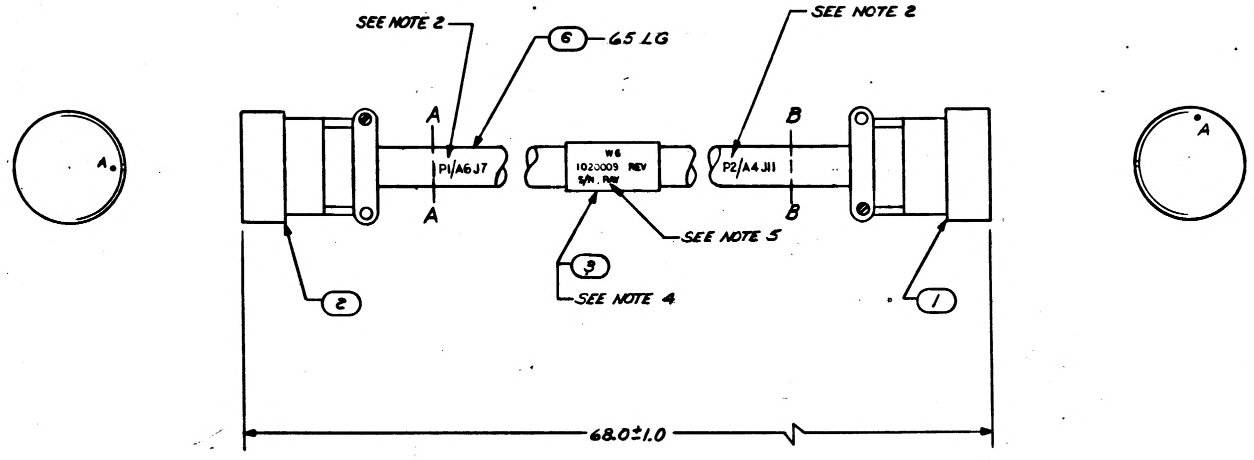
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CCB RELEASED PER TDRR 0435	24OCT63	OK

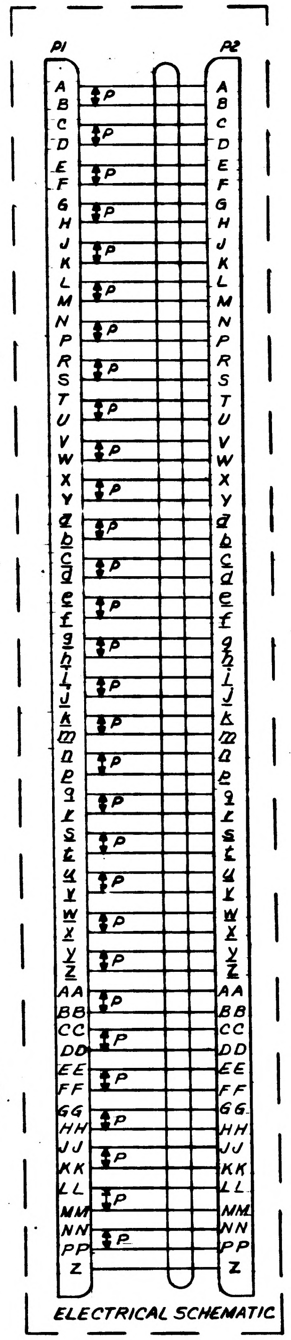
ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION				
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			65	
	56	BLK	22	5	67	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	5	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			95	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	25	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


P1
P2
CUTLINE
CUTLINE
A
A
B
B

STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO.2

STRIP LEADS .19, DO NOT TIN, ATTACH CRIMP PINS PART OF FIND NO.1


SEE NOTE 2
⑥ 65 LG
SEE NOTE 2
A
A
A
B
B
A
P1/A6J7
W6
1020009 REV
S/N
P2/A4J11
③
SEE NOTE 4
SEE NOTE 5
②
①
68.0±1.0


P1
P2
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Y
a
b
c
d
e
f
g
h
i
j
k
m
n
p
q
r
s
t
u
v
w
x
y
z
AA
BB
CC
DD
EE
FF
GG
HH
JJ
KK
LL
MM
NN
PP
Z
P
ELECTRICAL SCHEMATIC

'FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0435 DATE 24OCT63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U II, GRADE II, CLASS I, CATEGORY I, FOR FIND NO.6 AWG 5/8
4. BOND FIND NO.3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE.
5. MARK .08 HIGH BLACK PER ND1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	SEE NOTE 3	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, BLK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-24-61P	CONNECTOR	2
1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE SEPT 3 63
CHECKED 5 OCT 63
APPROVAL 14 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

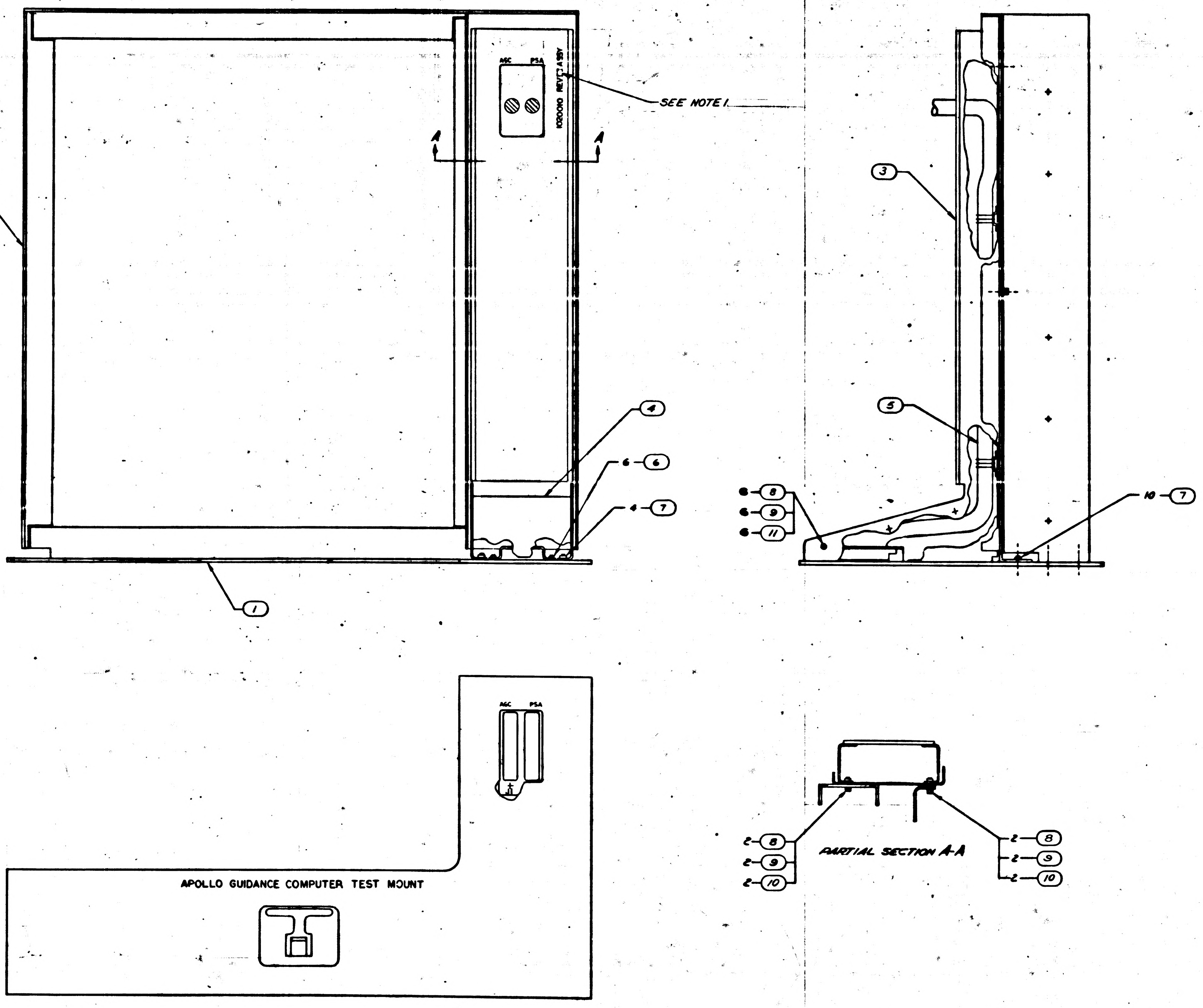
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W6
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020009
SCALE 1/1
WT
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

LTR	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]
A	CL II CHANGE PER RD-R5652 DR R. Sargent CHK [illegible] APPD [illegible]	[illegible]	[illegible]
B	CHANGED PER TDRR 10105 DR S.T. [illegible] CHK [illegible] APPD [illegible]	[illegible] 64	[illegible]


AGC
PSA
1020010 REV [illegible] ASSY
SEE NOTE 1.
A
A
2
1
4
6-6
4-7
3
5
6-8
6-9
6-11
10-7
APOLLO GUIDANCE COMPUTER TEST MOUNT
AGC
PSA
PARTIAL SECTION A-A
2-8
2-9
2-10
2-8
2-9
2-10

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 11/17/63

NOTES
1. MARK APPLICABLE REV NO. PER ND1002019
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
6	MS35216-43	SCREW PAN HD CROSS RECESSED	11
4	MS35216-44	SCREW PAN HD CROSS RECESSED	10
10	MS35338-80	WASHER, LOCK SPLIT	9
10	MS15795-307	WASHER, FLAT	8
14	MS21044C08	NUT SELF-LOCKING	7
6	MS21044C06	NUT SELF-LOCKING	6
1	1020091	CABLE ASSY	5
1	1020004	COVER PLATE ACCESS	4
1	1020007	CASING PROTECTIVE	3
1	1014423	CHASSIS ASSY	2
1	1020008	PANEL	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-[illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

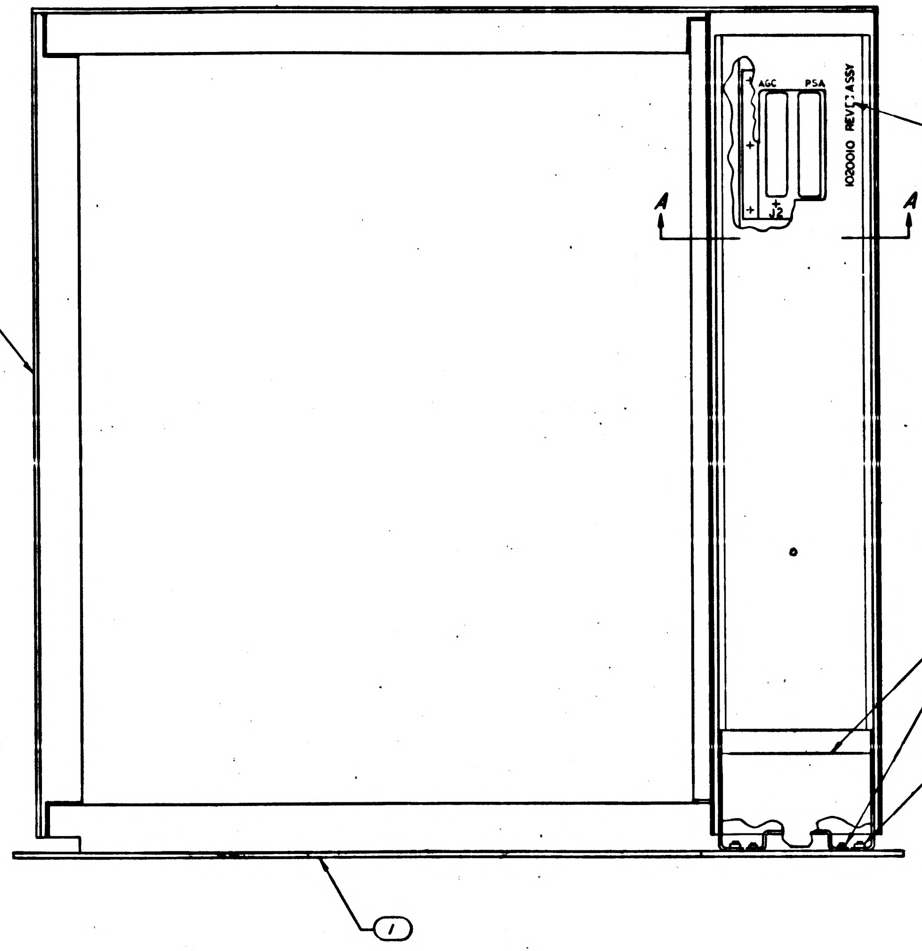
TEST MOUNT ASSEMBLY
AGC/ATE OPERATION CONSOLE

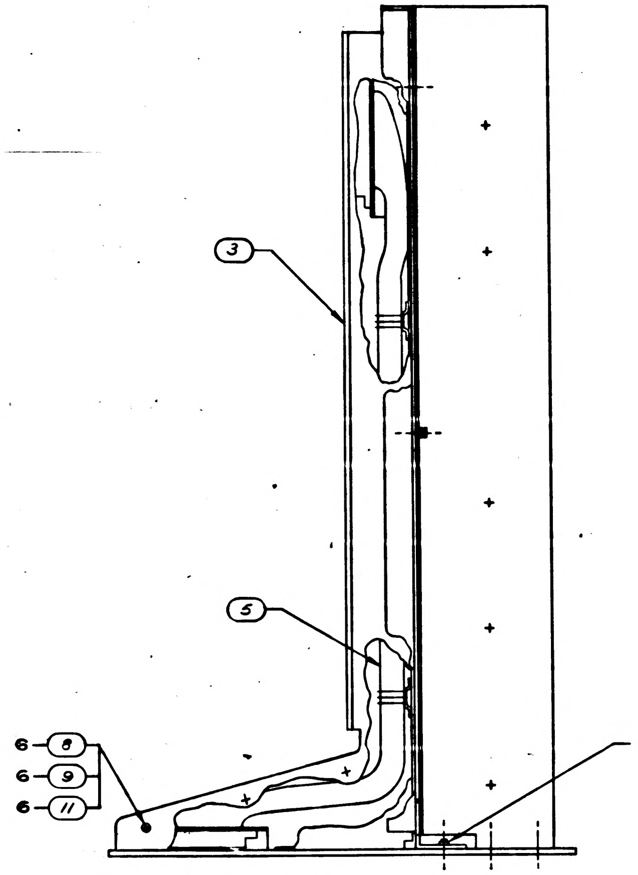
SIZE J
1020010

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

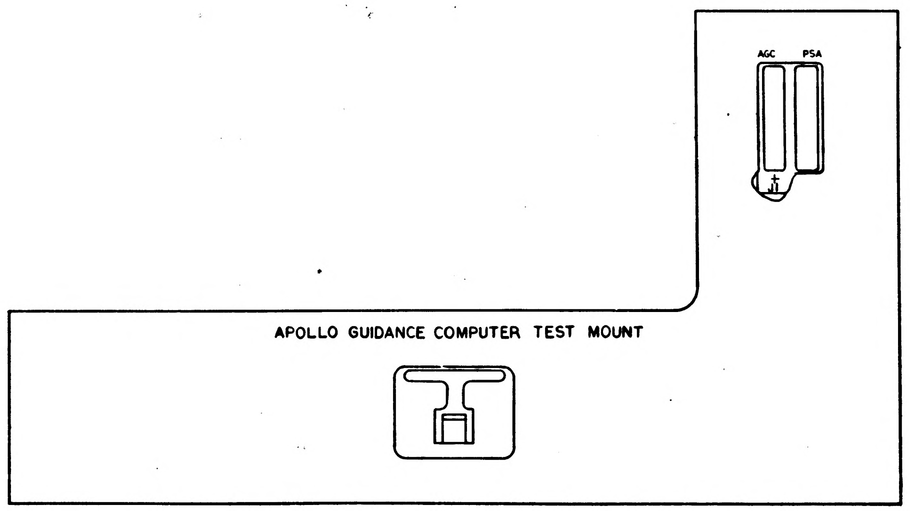
REVISIONS

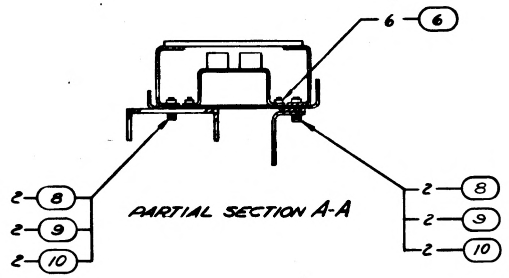
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03596	[illegible]	[illegible]





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03596 DATE 10/17/63





PARTIAL SECTION A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
6	MS35216-43	SCREW PAN HD CROSS RECESSED	11
4	MS35216-44	SCREW PAN HD CROSS RECESSED	10
10	MS35338-80	WASHER, LOCK SPLIT	9
10	MS15795-307	WASHER, FLAT	8
14	MS21044C08	NUT SELF-LOCKING	7
12	MS21044C06	NUT SELF-LOCKING	6
1	1020073	CABLE ASSY	5
1	1020004	COVER PLATE ACCESS	4
1	1020007	CASING PROTECTIVE	3
1	1014423	CHASSIS ASSY	2
1	1020008	PANEL	1

LIST OF MATERIALS

NOTES
1. MARK APPLICABLE REV NO. PER ND1002019
2. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 10 Sept
CHECKED David 16 Sept 63
APPROVAL H. Morse 4 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST MOUNT ASSEMBLY
AGC/CTS OPERATION CONSOLE

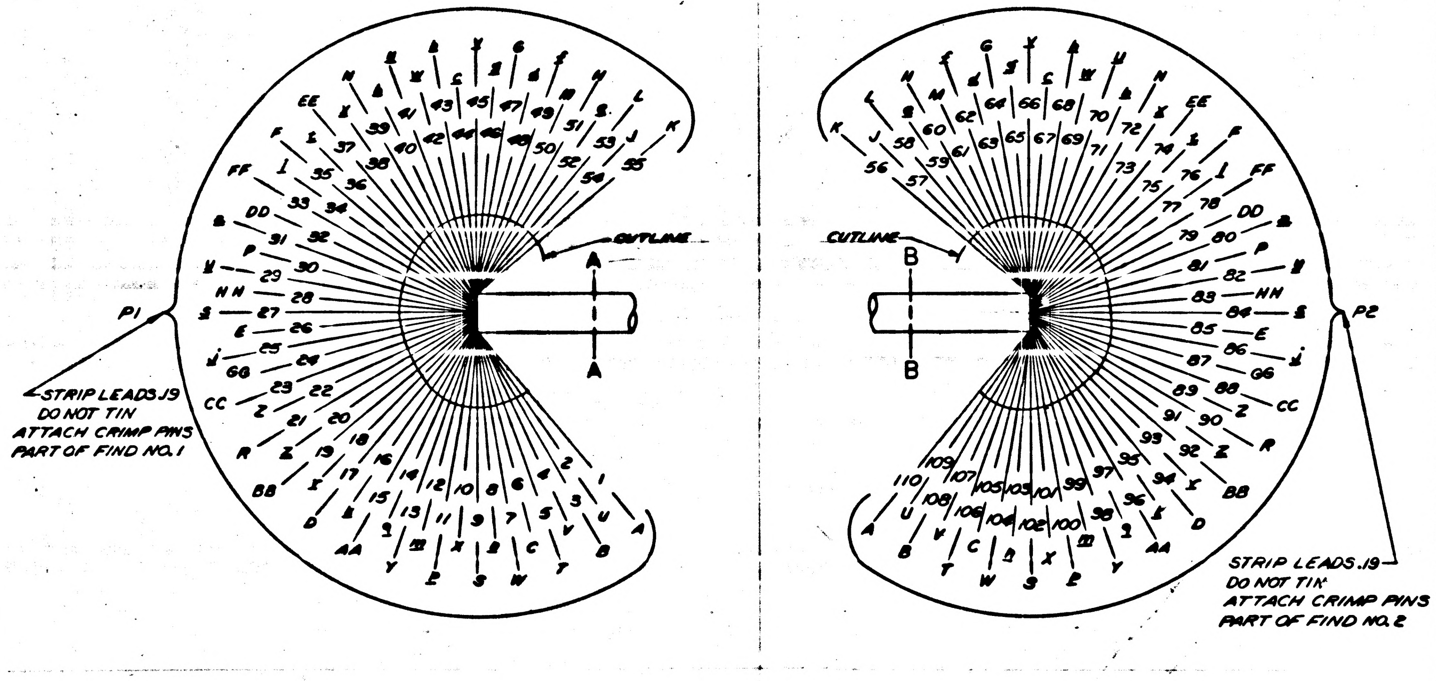
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020010
SCALE 1/2
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REV	DESCRIPTION	DATE	APPROVAL
A	CHANGED PER TDRR 07227 DR [illegible] CHK [illegible] APPD [illegible]	[illegible]	KEG

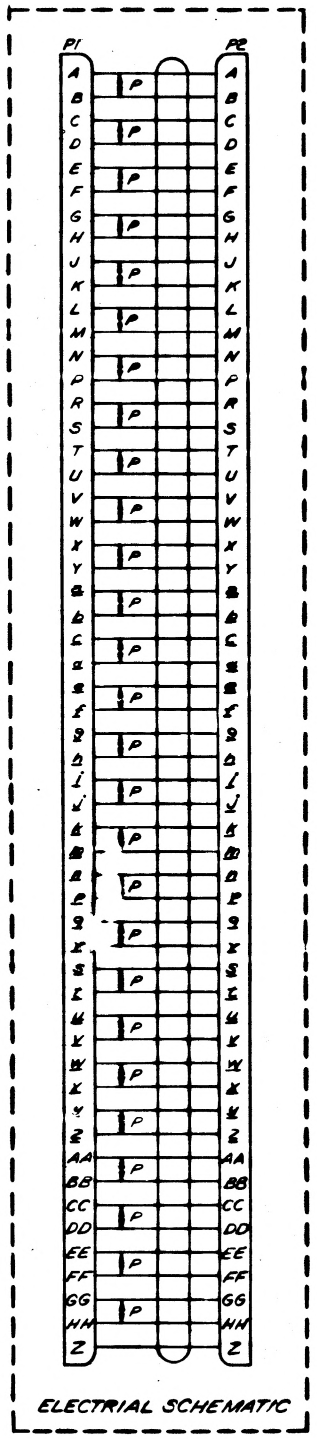
ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	

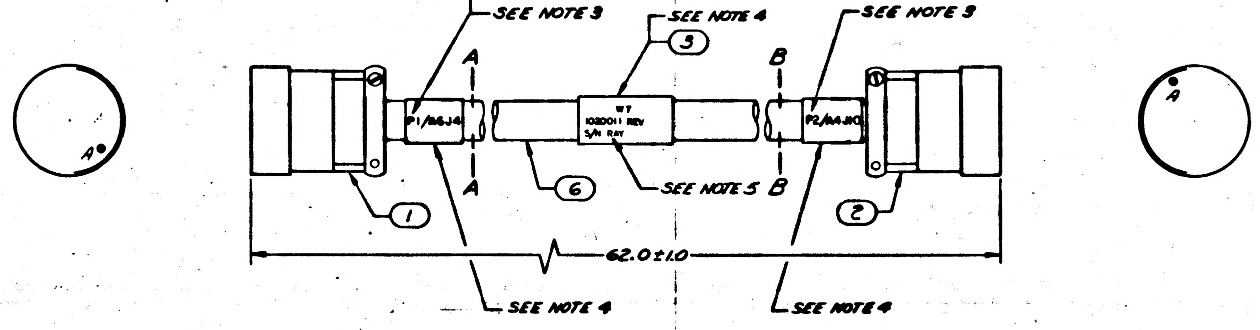


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1

STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2



ELECTRIAL SCHEMATIC



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0438 DATE 24 Oct 63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE a, CLASS I, CATEGORY I FOR FIND NO. 6 AWG $\frac{5}{8}$ IN.
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	MIL-W-16878, TYPE E, 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-22-55PW	CONNECTOR	2
1	MS3126F-22-55P	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 25 [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]

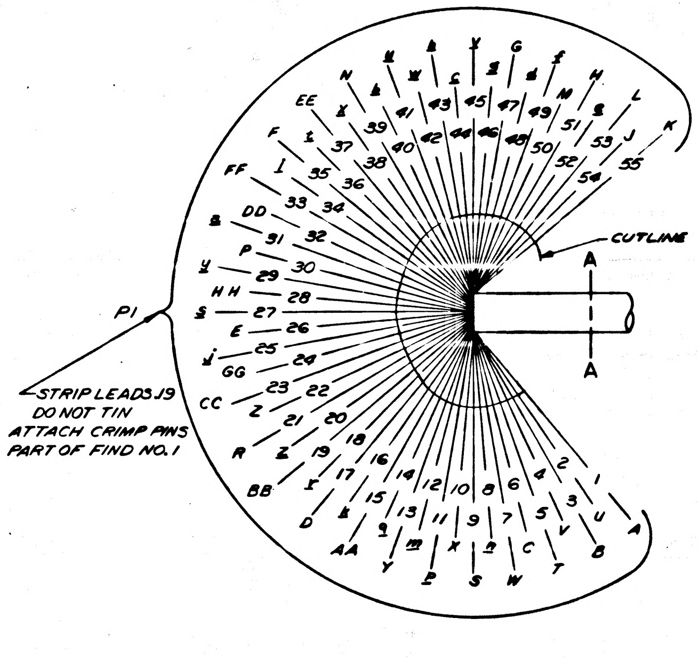
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

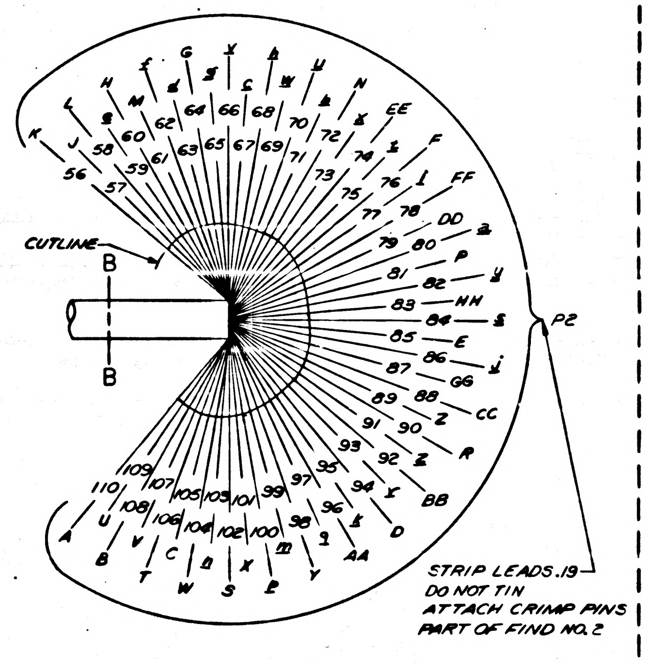
CABLE ASSEMBLY
W7
AGC/CTS OPERATION CONSOLE

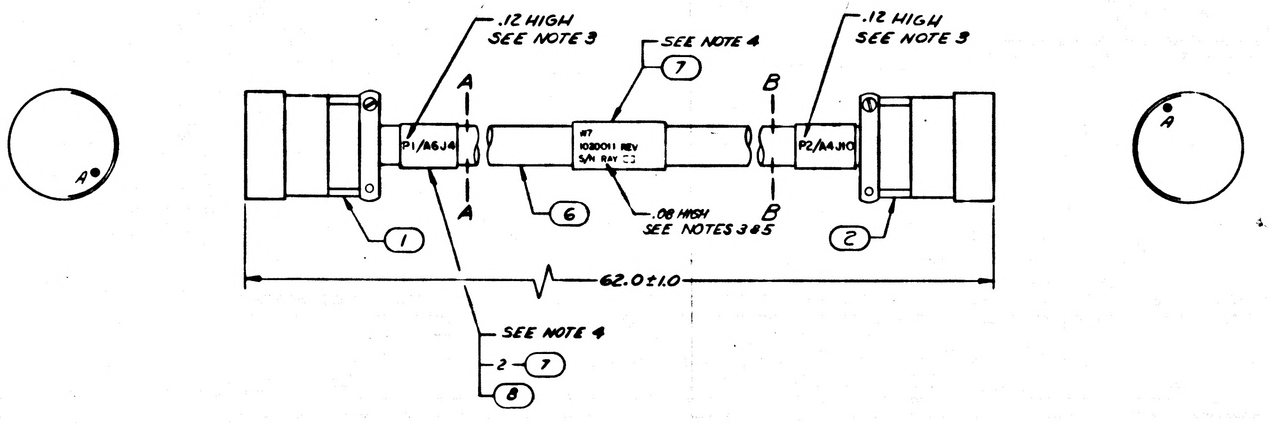
CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020011
SCALE 1/1 WT SHEET 1 OF 1

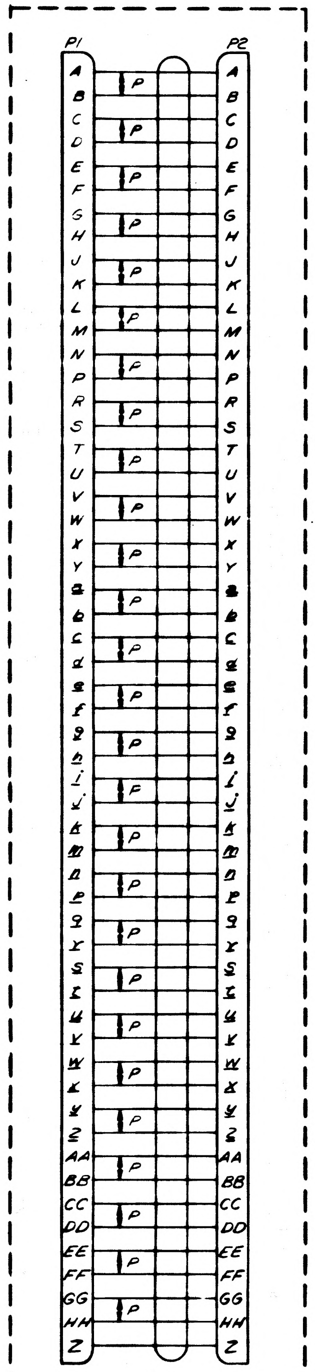
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
~~A~~	~~GL B RELEASED PER TDRR NO. 35~~		
A	CHANGED PER TDRR 07227 DR CHK APPD		MLD
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18942 DR RBurt CHK APPD	30 June 65	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	


P1
CUTLINE
A
A
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1


P2
CUTLINE
B
B
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2


.12 HIGH
SEE NOTE 3
P1/A6J4
A
A
SEE NOTE 4
7
W7
1020011 REV
S/N RAY
.08 HIGH
SEE NOTES 3 & 5
6
B
B
.12 HIGH
SEE NOTE 3
P2/A4J10
1
2
62.0±1.0
SEE NOTE 4
2
7
8
A
A



ELECTRIAL SCHEMATIC

NOTES
1. FOR FABRICATION SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE a, CLASS I, CATEGORY I FOR FIND NO. 6 AWG $\frac{5}{8}$ IN.
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND NO 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	AR	1006253	ADHESIVE	8
	3	1014472-4A	BAND MARKER, CABLE	7
*	5.5	SEE NOTE 2	SLEEVING	6
*	160	1014341-11	WIRE, ELECTRICAL	5
*	5.5	MIL-W 16878/4, TYPE E, 22 BLK	WIRE, ELECTRICAL	4
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-22-55PW	CONNECTOR	2
	1	MS3126F-22-55P	CONNECTOR	1

LIST OF MATERIALS

*DENOTES LENGTH IN FEET

1014465
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-499
DRAWN DATE 2 SEP
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

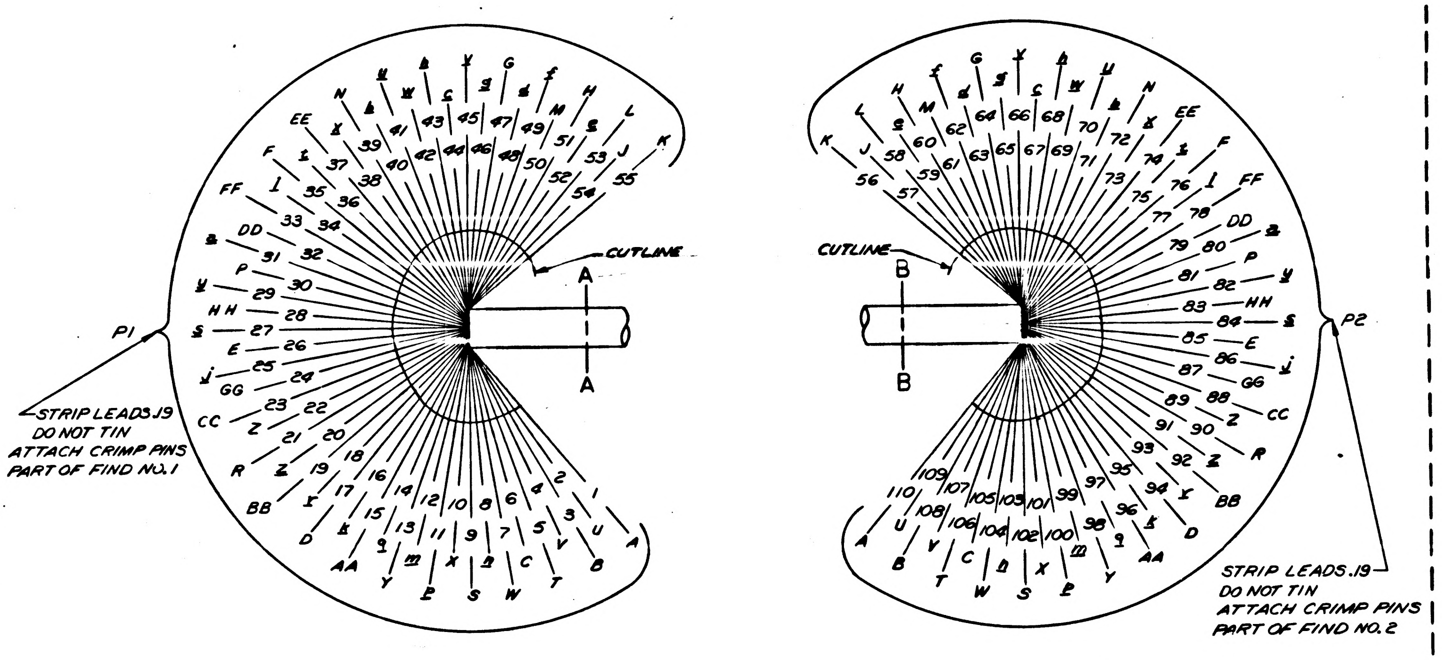
CABLE ASSEMBLY
W7
OPERATION CONSOLE

CODE IDENT NO. — | SIZE J | NASA DRAWING NO 1020011
SCALE 1/1 | WT | SHEET 1 OF 1

1020011 B

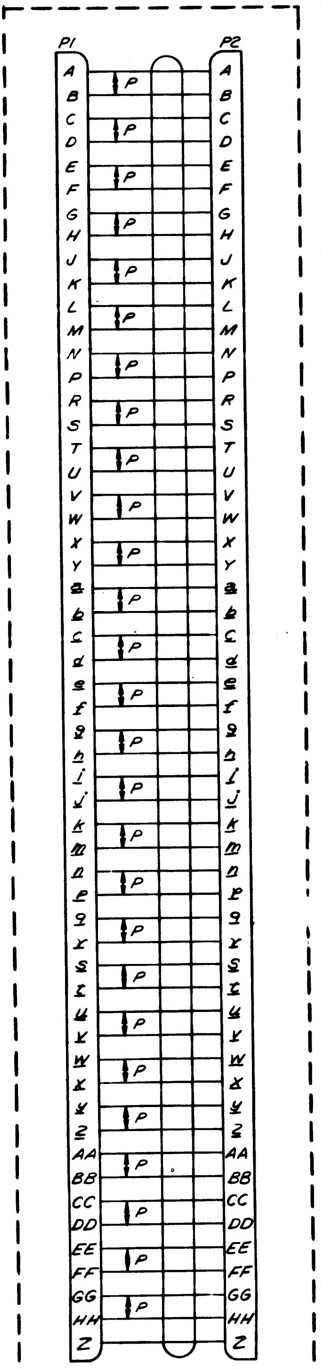
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO. 0435	[illegible]	[illegible]

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	

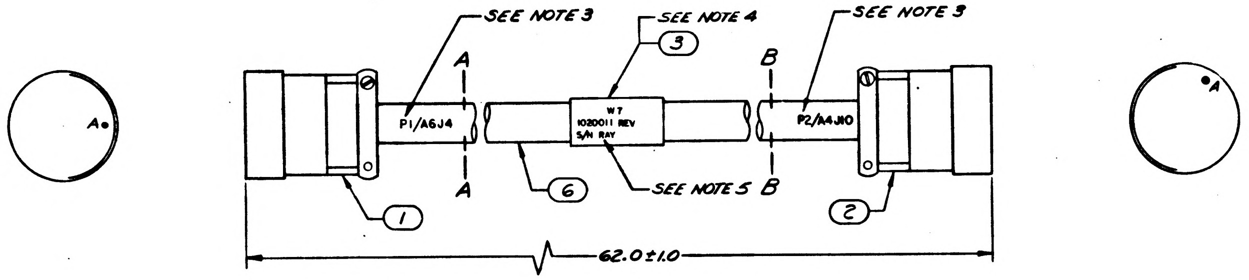


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1

STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2



ELECTRIAL SCHEMATIC



SEE NOTE 3

SEE NOTE 4

SEE NOTE 5

SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0435 DATE 24 Oct 63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE a, CLASS I, CATEGORY I FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 USING TETRAHYDROFURAN WITH 10 % POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	SEE NOTE 2	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	ND1002181 TYPE I CL I	WIRE, ELECTRICAL AWG 22 BLK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-22-55PW	CONNECTOR	2
1	MS3126F-22-55P	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

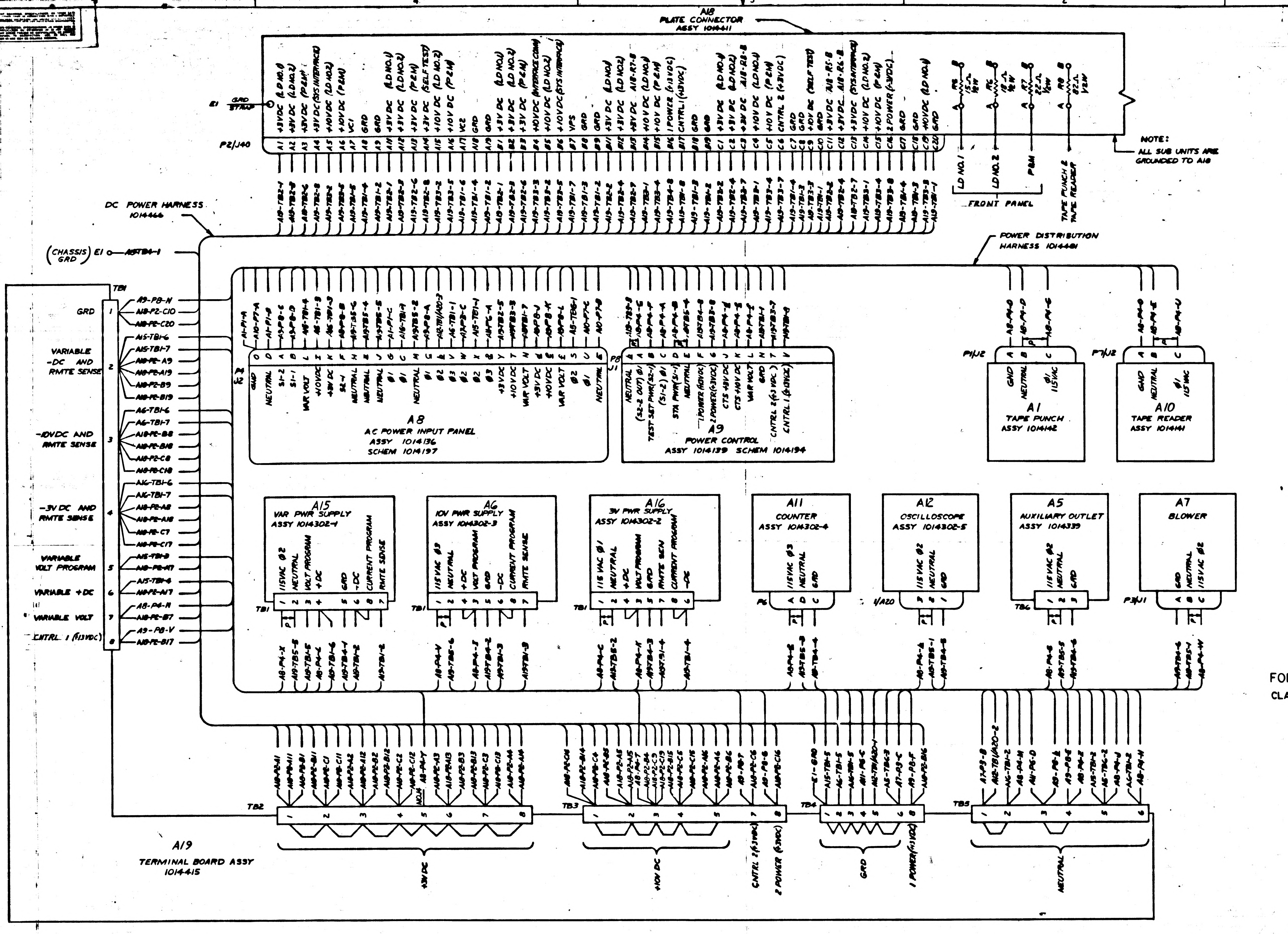
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE 25SEP62
CHECKED [illegible] 5 Oct 63
APPROVAL [illegible] 4 Oct 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 24 Oct 63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W7
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020011
SCALE 1/1
WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPR
—	CLB RELEASED PER TDRR		
A	CHANGED PER TDRR 06682 DR. Ken Bull CHK JW/J.J APPDS C–Ly	3MAR 64	KB


A18
PLATE CONNECTOR
ASSY 1014411
E1 GRD STRAP
P2/J40
NOTE:
ALL SUB UNITS ARE GROUNDED TO A18
LD NO.1
LD NO.2
P&M
TAPE PUNCH & TAPE READER
FRONT PANEL
DC POWER HARNESS 1014466
POWER DISTRIBUTION HARNESS 1014481
(CHASSIS GRD) E1
TB1
GRD
VARIABLE -DC AND RMTE SENSE
-10VDC AND RMTE SENSE
-3V DC AND RMTE SENSE
VARIABLE VOLT PROGRAM
VARIABLE +DC
VARIABLE VOLT
CNTRL 1 (+13VDC)
A8
AC POWER INPUT PANEL
ASSY 1014136
SCHEM 1014197
A9
POWER CONTROL
ASSY 1014139 SCHEM 1014194
A1
TAPE PUNCH
ASSY 1014142
A10
TAPE READER
ASSY 1014141
A15
VAR PWR SUPPLY
ASSY 1014302-1
A6
10V PWR SUPPLY
ASSY 1014302-3
A16
3V PWR SUPPLY
ASSY 1014302-2
A11
COUNTER
ASSY 1014302-4
A12
OSCILLOSCOPE
ASSY 1014302-5
A5
AUXILIARY OUTLET
ASSY 1014339
A7
BLOWER
TB2
TB3
TB4
TB5
A19
TERMINAL BOARD ASSY
1014415
+3V DC
+10V DC
CNTRL 2 (+13VDC)
2 POWER (+13VDC)
GRD
1 POWER (+13VDC)
NEUTRAL

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06681 DATE 11/1/63

NOTES:
1. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

REF DRAWING
MECHANICAL ASSY 1014156
CABLE ASSY 1014466 & 1014481

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN Ken Bull DATE 30CT63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SNT APPROVAL
SNT APPROVAL

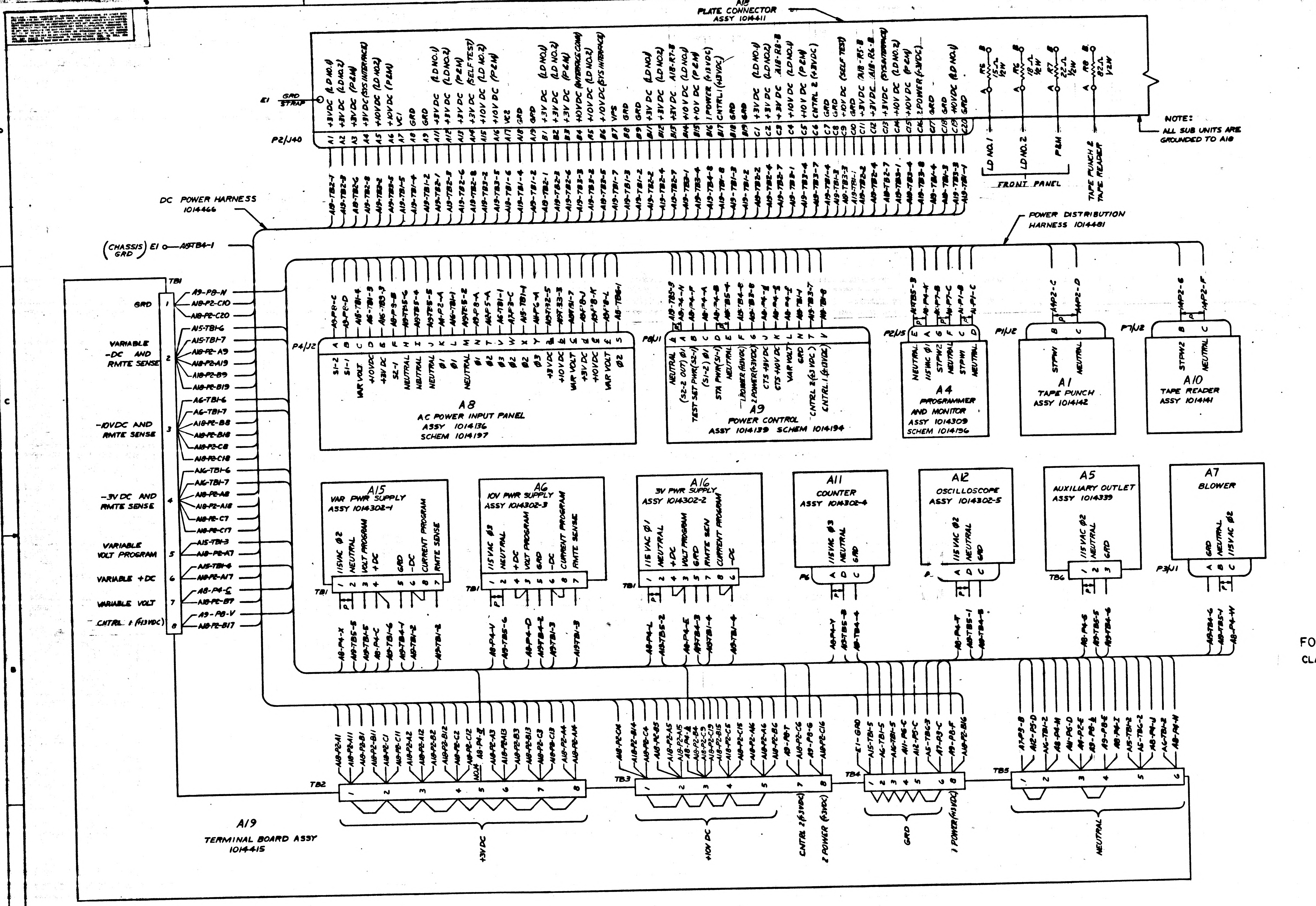
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
AC & DC POWER DISTRIBUTION
COMPUTER TEST SET

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020019
SCALE NONE WT SHEET 1 OF

1020019

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR		


A18
PLATE CONNECTOR
ASSY 1014611
E1 GRD STRAP
P2/J40
NOTE:
ALL SUB UNITS ARE GROUNDED TO A18
LD NO.1
LD NO.2
P&M
TAPE PUNCH & TAPE READER
FRONT PANEL
DC POWER HARNESS
1014466
POWER DISTRIBUTION HARNESS 1014481
(CHASSIS GRD) E1
A19-TB4-1
TB1
GRD
VARIABLE -DC AND RMTE SENSE
-10VDC AND RMTE SENSE
-3V DC AND RMTE SENSE
VARIABLE VOLT PROGRAM
VARIABLE +DC
VARIABLE VOLT
CNTRL 1 (+13VDC)
P4/J2
A8
AC POWER INPUT PANEL
ASSY 1014136
SCHEM 1014197
P8/J1
A9
POWER CONTROL
ASSY 1014139 SCHEM 1014134
P2/J5
A4
PROGRAMMER AND MONITOR
ASSY 1014309
SCHEM 1014136
P1/J2
A1
TAPE PUNCH
ASSY 1014142
P7/J2
A10
TAPE READER
ASSY 1014141
A15
VAR PWR SUPPLY
ASSY 1014302-1
A6
10V PWR SUPPLY
ASSY 1014302-3
A16
3V PWR SUPPLY
ASSY 1014302-2
A11
COUNTER
ASSY 1014302-4
A12
OSCILLOSCOPE
ASSY 1014302-5
A5
AUXILIARY OUTLET
ASSY 1014339
A7
BLOWER
TB1
P6
TB6
P3/J1
TB2
TB3
TB4
TB5
A19
TERMINAL BOARD ASSY
1014415
+3V DC
+10V DC
CNTRL 2 (+3VDC)
2 POWER (+3VDC)
GRD
1 POWER (+13VDC)
NEUTRAL

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04681 DATE 1/10/63

NOTES:
1. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATIONS WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

REF DRAWING
MECHANICAL ASSY 1014156
CABLE ASSY 1014466 & 1014481

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 9 OCT 62
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
AC & DC POWER DISTRIBUTION
COMPUTER TEST SET

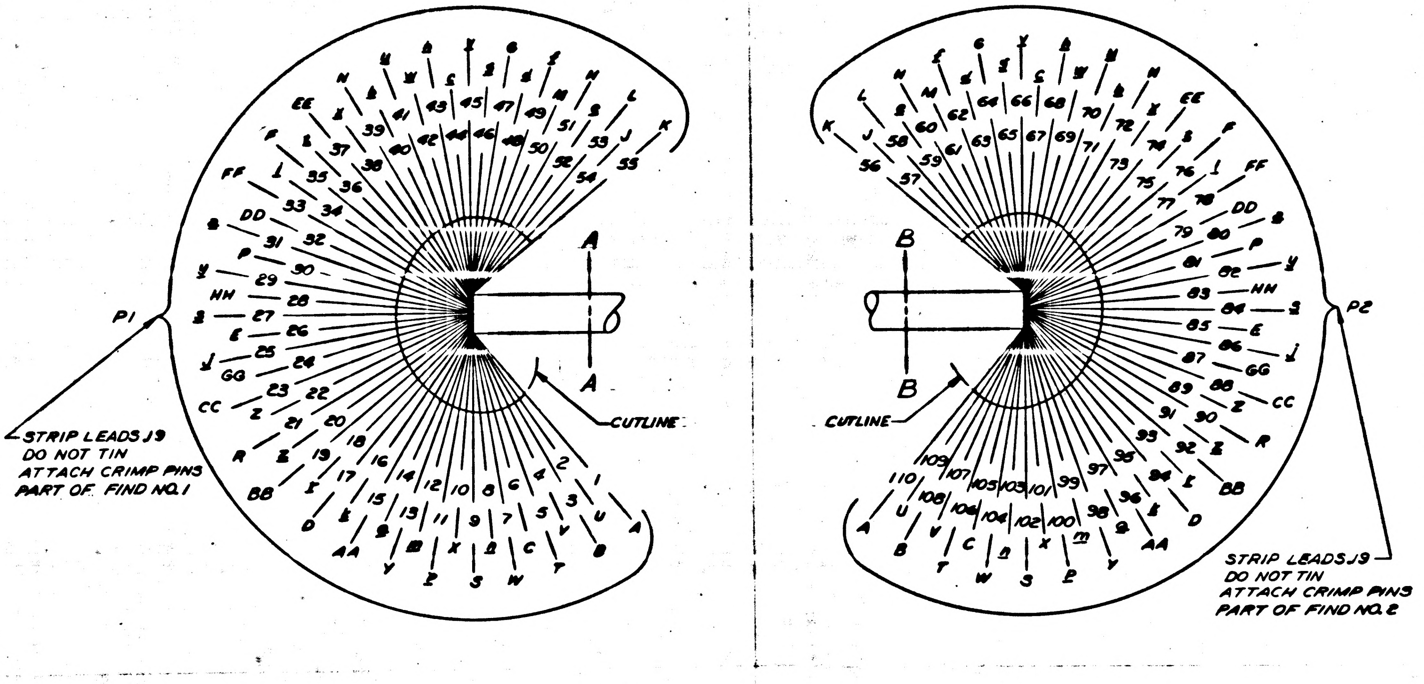
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020C19
SCALE NONE
WT
SHEET 1 OF 1

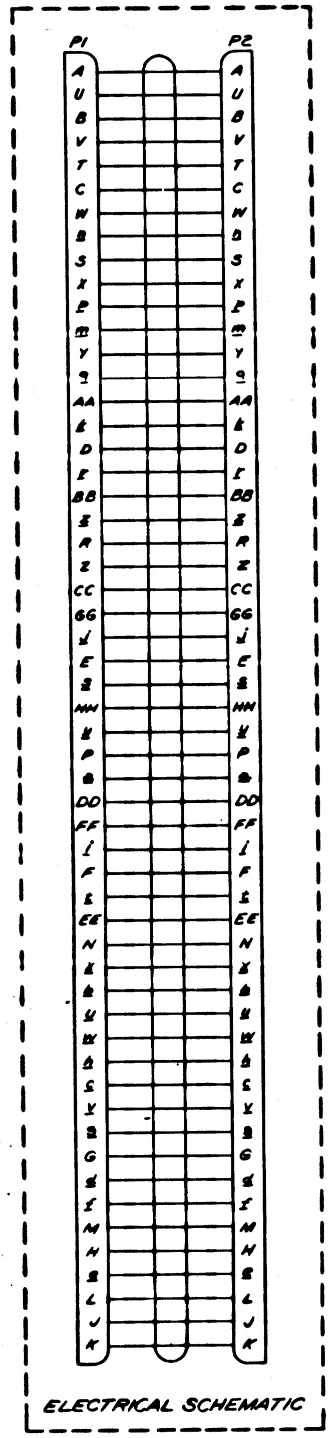
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

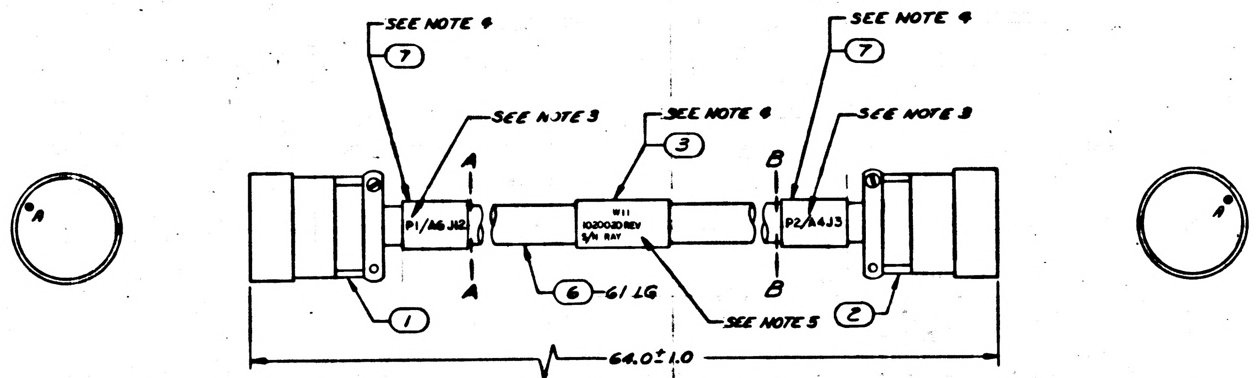
10501150

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
A	CHANGED PER TDRR 07225 DR. G. Bunn CHK APPD		KWB

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	49	WHT	22	4	62	
	50				61	
	51				60	
	52				59	
	1				110	
	2				109	
	3				108	
	4				107	
	5				106	
	6				105	
	7				104	
	8				103	
	9				102	
	10				101	
	11				100	
	12				99	
	13				98	
	14				97	
	15				96	
	16				95	
	17				94	
	18				93	
	19				92	
	20				91	
	21	WHT	22	4	90	
	22	BLK	22	5	89	
	23	WHT	22	4	88	
	24				87	
	25				86	
	26				85	
	27				84	
	28				83	
	29				82	
	30				81	
	31				80	
	32				79	
	33				78	
	34				77	
	35				76	
	36				75	
	37				74	
	38				73	
	39				72	
	40				71	
	41				70	
	42				69	
	43				68	
	44				67	
	45				66	
	46				65	
	47				64	
	48				63	
	53				58	
	54				57	
	55	WHT	22	4	56	


P1
P2
A
A
B
B
CUTLINE
CUTLINE
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2


P1
P2
ELECTRICAL SCHEMATIC


SEE NOTE 4
7
SEE NOTE 3
SEE NOTE 4
3
SEE NOTE 4
7
SEE NOTE 3
A
A
B
B
P1/A6J12
W11
1020020 REV
S/N RAY
P2/A4J3
1
6
61 LG
SEE NOTE 5
2
64.0±1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 00397 DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE A, CLASS I, CATEGORY I FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .12 HIGH BLK CHARACTERS PER ND1002019
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	MIL-W-16878/4, TYPE E, 22 BLK	WIRE, ELECTRICAL	5
AR	MIL-W-16878/4, TYPE E, 22 WHT	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-22-55PX	CONNECTOR	2
1	MS3126F-22-55PY	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 4 SEP 63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W11
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020020
SCALE 1/1
WT
SHEET 1 OF 1

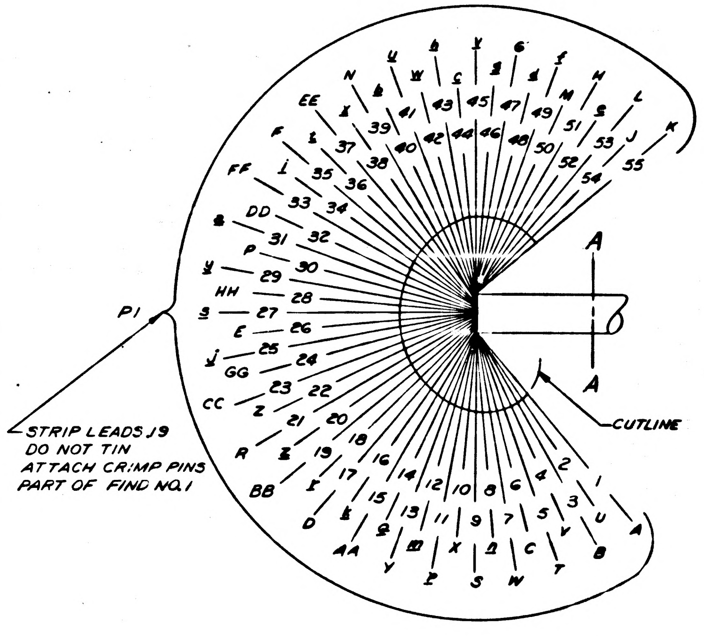
1020020

102C020

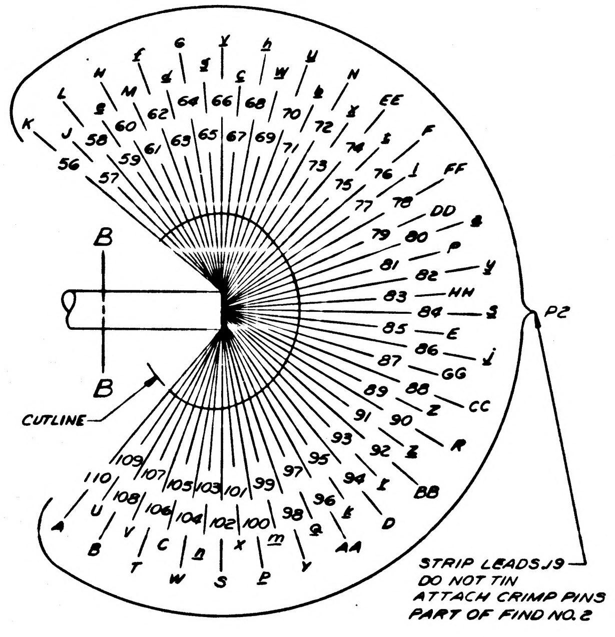
1050050

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	~~CCB RELEASED PER TDRR~~		
A	CHANGED PER TDRR 07225 DR. W. Brown CHK APPD	14 Apr 69	KVP
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18942 DR CHK R. Mota APPD	30 June 69	

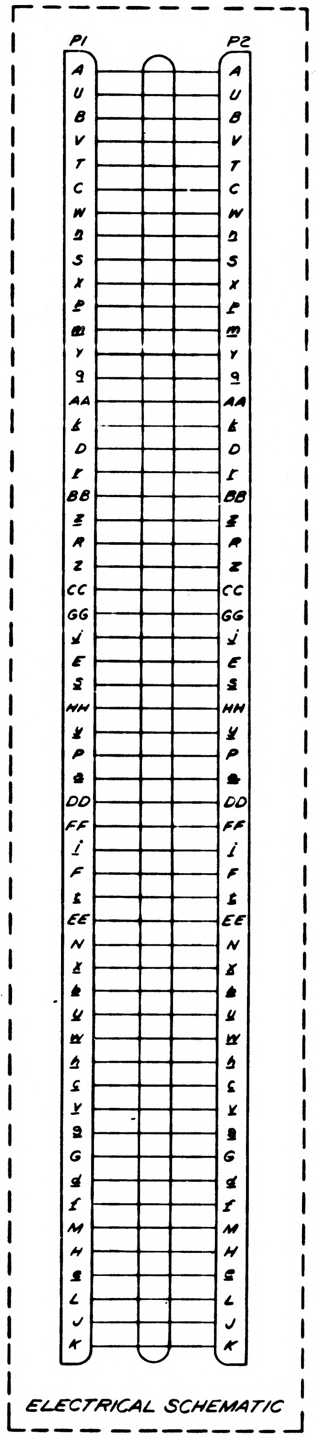
ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	49	WHT	22	4	62	
	50				61	
	51				60	
	52				59	
	1				110	
	2				109	
	3				108	
	4				107	
	5				106	
	6				105	
	7				104	
	8				103	
	9				102	
	10				101	
	11				100	
	12				99	
	13				98	
	14				97	
	15				96	
	16				95	
	17				94	
	18				93	
	19				92	
	20				91	
	21	WHT	22	4	90	
	22	BLK	22	5	89	
	23	WHT	22	4	88	
	24				87	
	25				86	
	26				85	
	27				84	
	28				83	
	29				82	
	30				81	
	31				80	
	32				79	
	33				78	
	34				77	
	35				76	
	36				75	
	37				74	
	38				73	
	39				72	
	40				71	
	41				70	
	42				69	
	43				68	
	44				67	
	45				66	
	46				65	
	47				64	
	48				63	
	53				58	
	54				57	
	55	WHT	22	4	56	



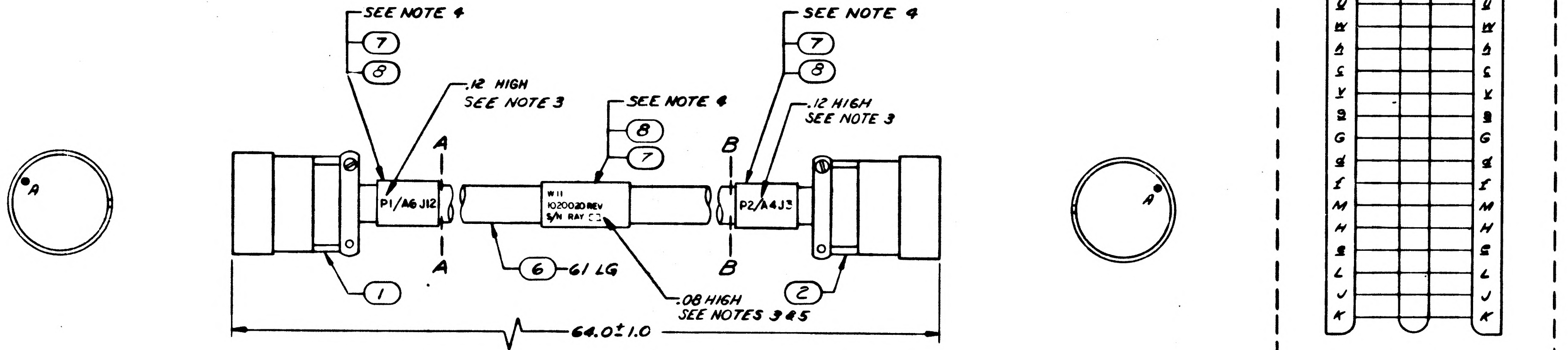
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1



STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.2



ELECTRICAL SCHEMATIC



NOTES

1. FOR FABRICATION SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE A, CLASS I, CATEGORY I FOR FIND NO. 6 AWG 5/8
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND NO. 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	AR	1006253	ADHESIVE	8
	3	1014472-4A	BAND MARKER, CABLE	[illegible]
*	5.5	SEE NOTE 2	SLEEVING	6
*	5.5	MIL-W-16878/4, TYPE E, 22 BLK	WIRE, ELECTRICAL	[illegible]
*	300	MIL-W-16878/4, TYPE E, 22 WHT	WIRE, ELECTRICAL	[illegible]
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	[illegible]
	1	MS3126F-22-55PX	CONNECTOR	[illegible]
	1	MS3126F-22-55PY	CONNECTOR	[illegible]

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4498
DRAWN DATE 4 SEP 68
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY,
W11
OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020020
SCALE 1/1
WT
SHEET 1 OF 1

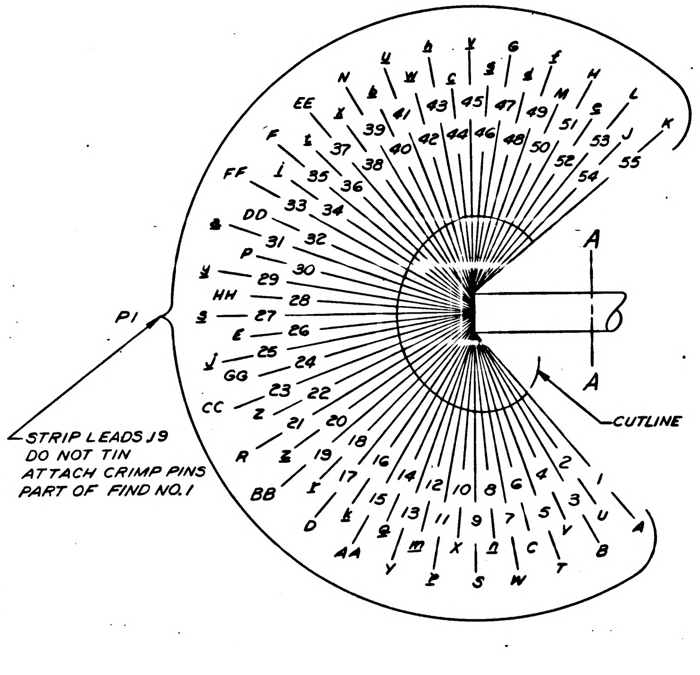
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

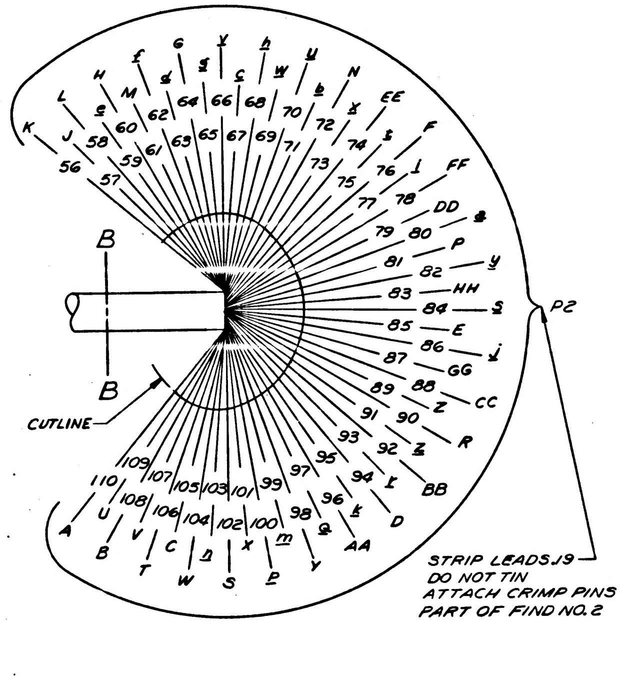
1020020 B

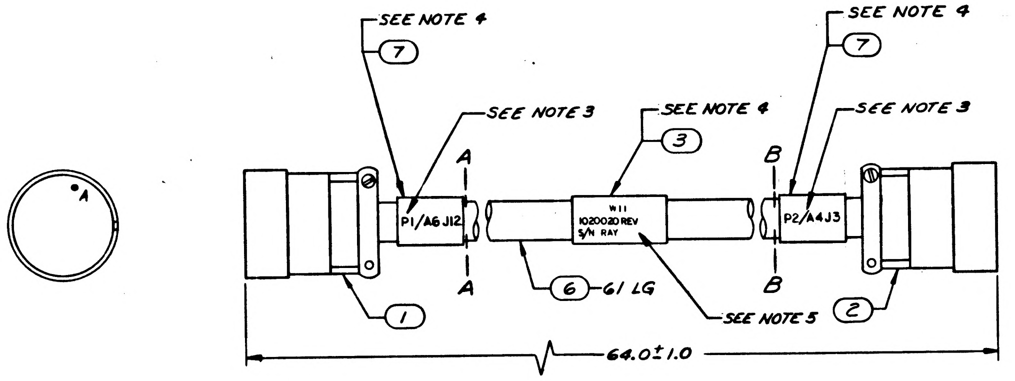
1020020 B

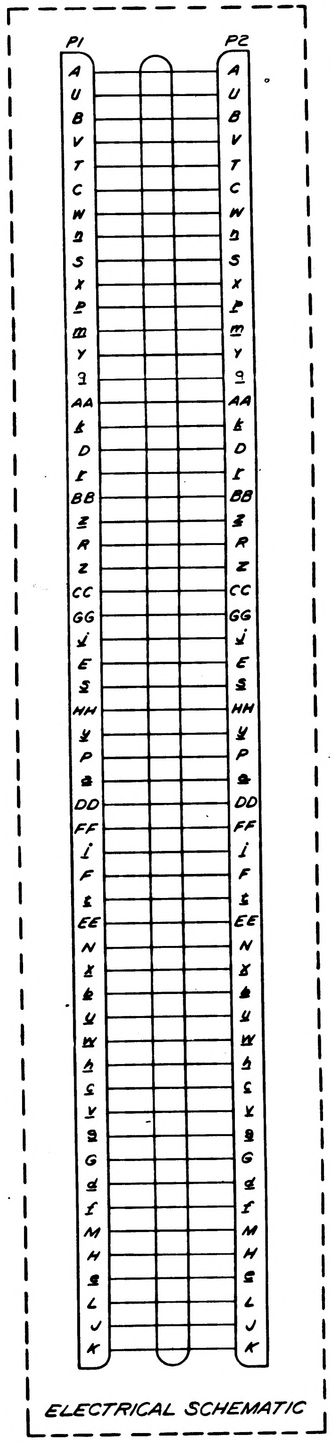
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	49	WHT	22	4	62	
	50				61	
	51				60	
	52				59	
	1				110	
	2				109	
	3				108	
	4				107	
	5				106	
	6				105	
	7				104	
	8				103	
	9				102	
	10				101	
	11				100	
	12				99	
	13				98	
	14				97	
	15				96	
	16				95	
	17				94	
	18				93	
	19				92	
	20				91	
	21	WHT	22	4	90	
	22	BLK	22	5	89	
	23	WHT	22	4	88	
	24				87	
	25				86	
	26				85	
	27				84	
	28				83	
	29				82	
	30				81	
	31				80	
	32				79	
	33				78	
	34				77	
	35				76	
	36				75	
	37				74	
	38				73	
	39				72	
	40				71	
	41				70	
	42				69	
	43				68	
	44				67	
	45				66	
	46				65	
	47				64	
	48				63	
	53				58	
	54				57	
	55	WHT	22	4	56	


P1
A
A
CUTLINE
STRIP LEADS J9
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1


P2
B
B
CUTLINE
STRIP LEADS J9
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.2


SEE NOTE 4
7
SEE NOTE 3
SEE NOTE 4
3
SEE NOTE 3
SEE NOTE 4
7
P1/A6J12
W11 1020020 REV S/N RAY
P2/A4J3
A
A
B
B
1
6
61 LG
SEE NOTE 5
2
64.0 ± 1.0



ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U a GRADE a CLASS I, CATEGORY I
FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .12 HIGH BLK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-3A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	ND1002181 TYPE I CL I	WIRE, ELECTRICAL AWG 22 BLK	5
AR	ND1002181 TYPE I CL I	WIRE, ELECTRICAL AWG 22 WHT	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-22-55PX	CONNECTOR	2
1	MS3126F-22-55PY	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE 4 SEP 63
CHECKED [illegible] 2 Oct 63
APPROVAL [illegible] 28 Oct 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W11
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020020
SCALE 1/1
WT
SHEET 1 OF 1

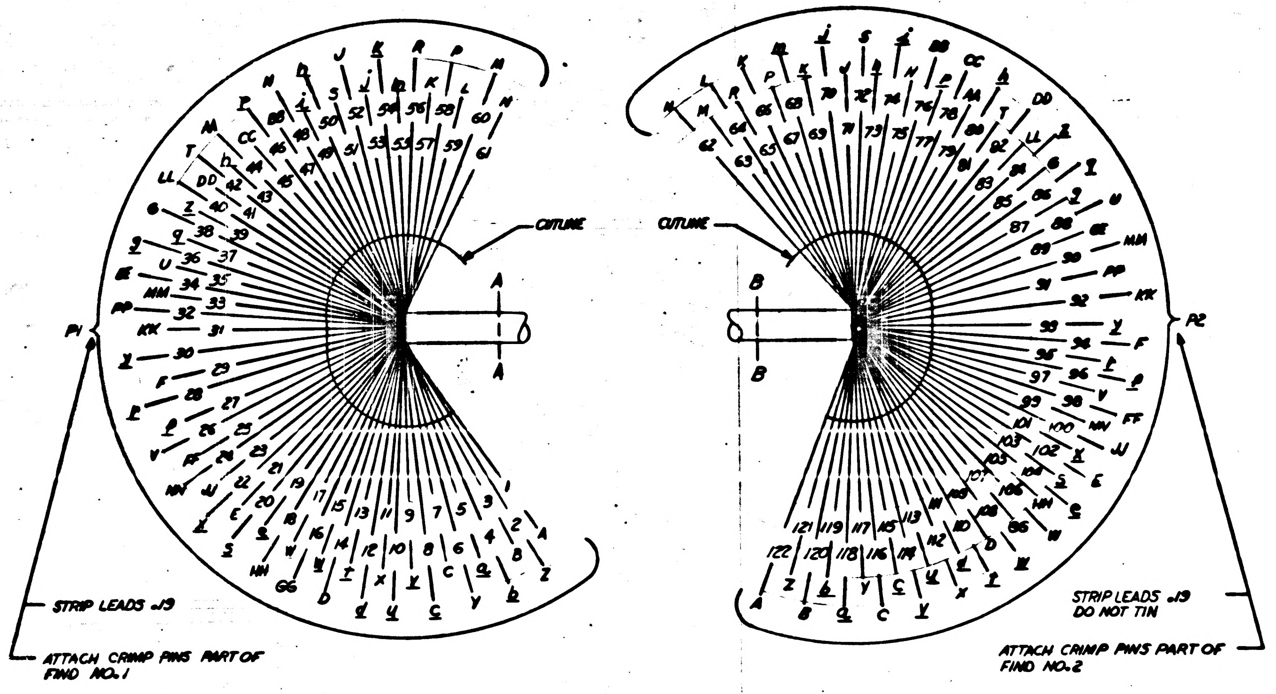
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

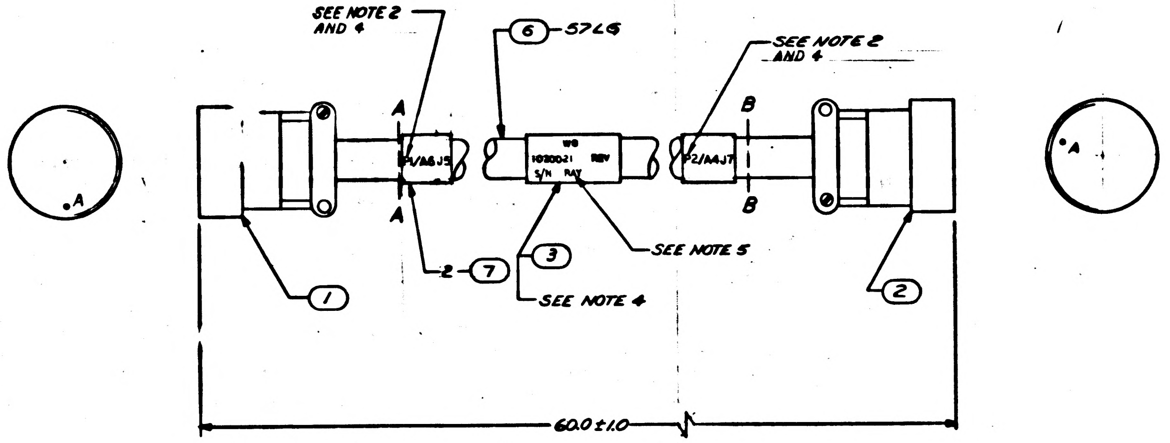
INCHES
PHOTOGRAPHIC SCALE ONLY

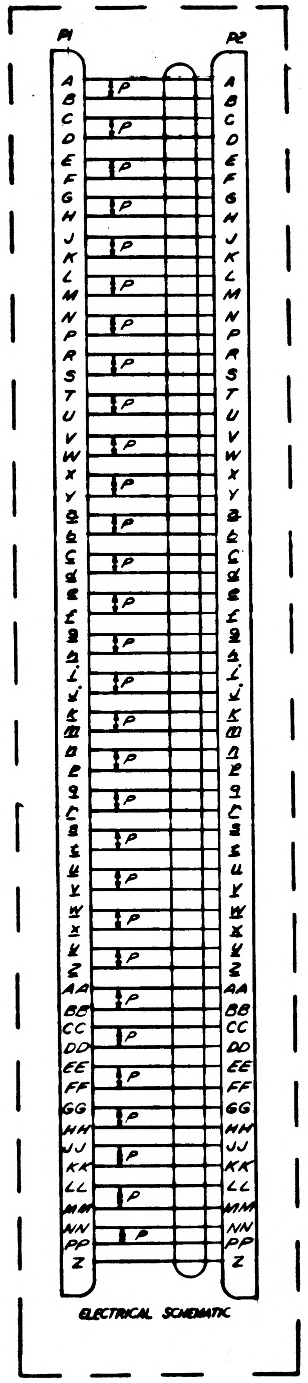
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04158		
A	CHANGED PER TDRR 07229 DR JP Leonard CK [illegible] APPD [illegible]	64	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			67	
	56	BLK	22	5	65	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	5	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			95	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	25	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


P1
CUTLINE
A
A
STRIP LEADS .19
ATTACH CRIMP PINS PART OF FIND NO. 1
P2
CUTLINE
B
B
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2


SEE NOTE 2 AND 4
6 - 57L6
SEE NOTE 2 AND 4
A
A
P1/A6J5
W8
1020021 REV
S/N RAY
P2/A4J7
B
B
1
2 - 7
3
SEE NOTE 4
SEE NOTE 5
2
60.0±1.0


P1
P2
ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04[illegible] DATE [illegible]

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U, GRADE A CLASS I CATERGORY I, FOR FIND NO. 6 AWG 5/8
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND 1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 3	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61P	CONNECTOR	2
1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J.P. Leonard DATE 3 Oct 63
CHECKED A. Cassino 30 Oct 63
APPROVAL [illegible] 14 Oct 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
NET APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

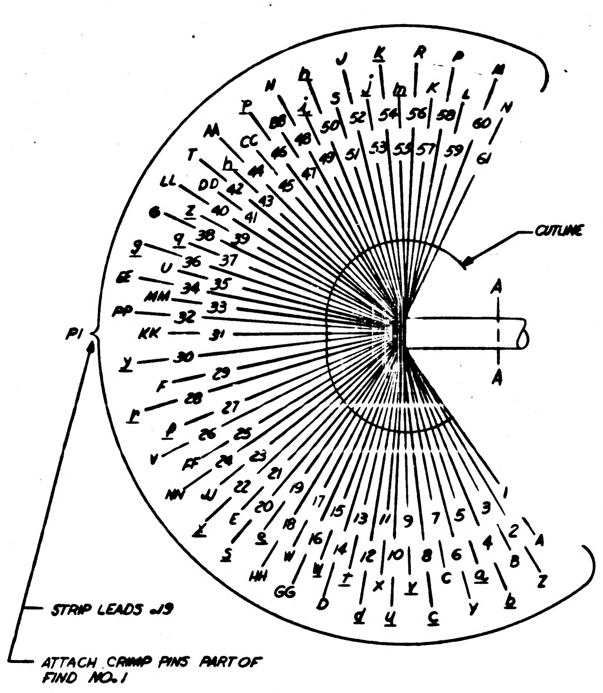
CABLE ASSEMBLY
W8
ABC/CTS OPERATION CONSOLE

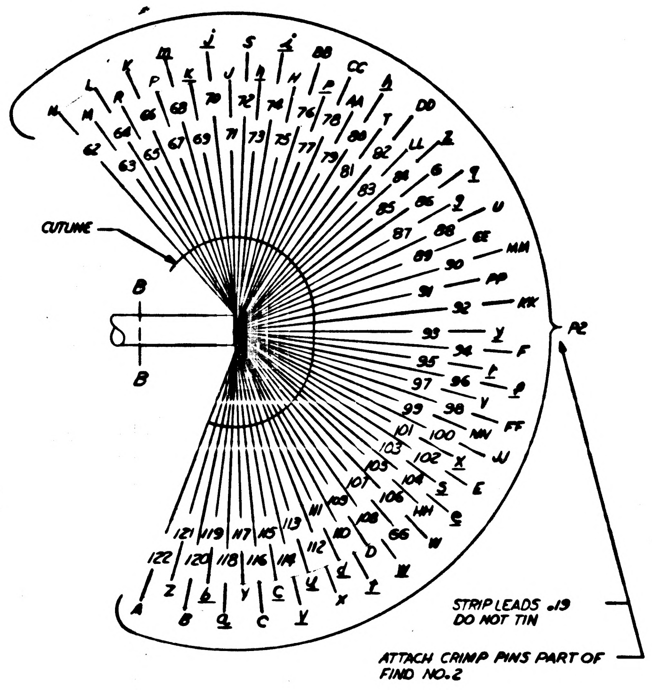
CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020021
SCALE 1/1 SHEET 1 OF 1

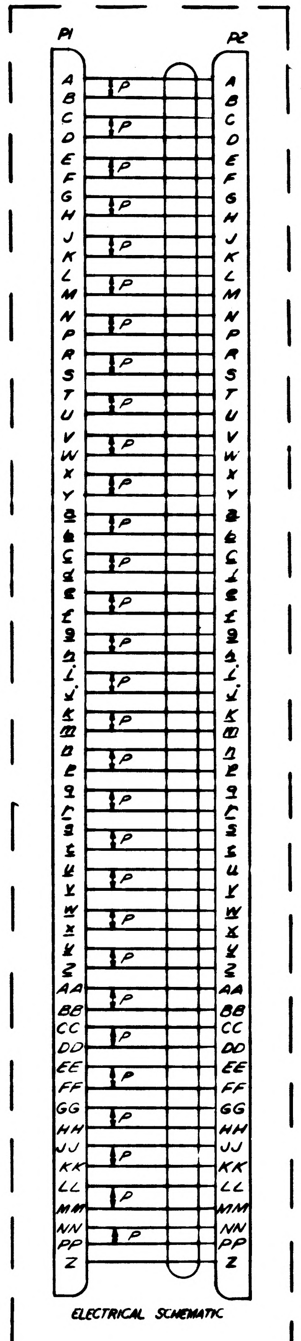
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]
A	CHANGED PER TDRR 07229 DR J P Leonard CHK [illegible] APPD [illegible]	[illegible] 64	[illegible]
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18942 DR R Burt CHK R. [illegible] APPD [illegible]	30 Jun 65	A.K.D.

ASSEMBLY INFORMATION CHART

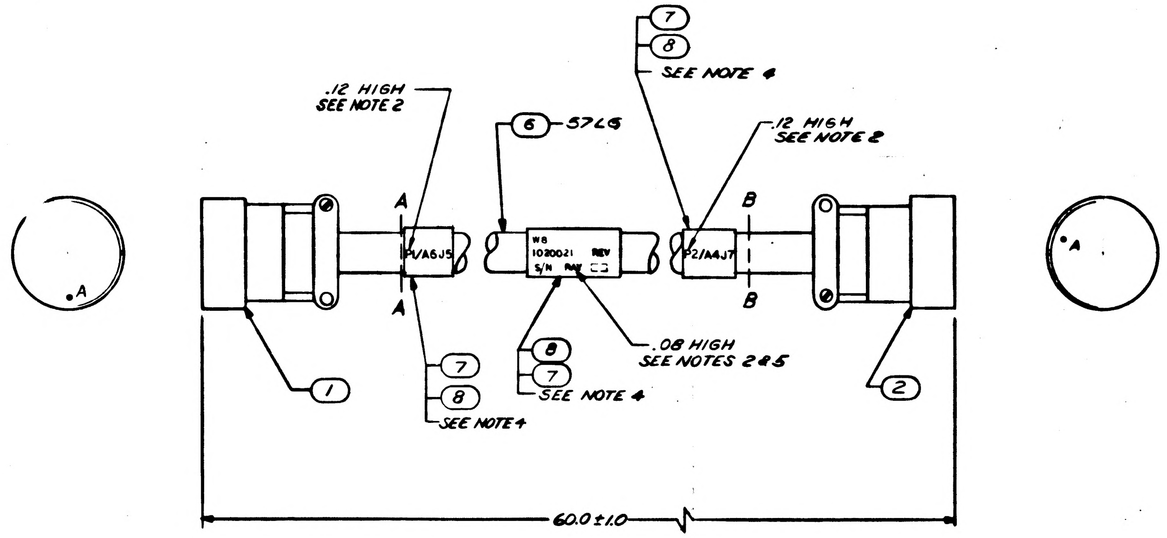
FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			67	
	56	BLK	22	5	65	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	5	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			95	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	25	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


P1
CUTLINE
A
A
STRIP LEADS .19
ATTACH CRIMP PINS PART OF FIND NO. 1


P2
CUTLINE
B
B
STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2



ELECTRICAL SCHEMATIC


.12 HIGH SEE NOTE 2
6
.57 LG
7
8
SEE NOTE 4
.12 HIGH SEE NOTE 2
A
A
B
B
P1/A6J5
W8 1020021 REV S/N RAY
P2/A4J7
1
7
8
SEE NOTE 4
8
7
SEE NOTE 4
.08 HIGH SEE NOTES 2 & 5
2
60.0 ±1.0

NOTES:

1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. MIL-I-631 TYPE F, FORM U2, GRADE 2 CLASS I CATERGORY I, FOR FIND NO. 6 AWG 5/8
4. BOND USING FIND NO. 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	8
	3	1014472-4A	BAND MARKER, CABLE	7
*	5.0	SEE NOTE 3	SLEEVING	6
*	160	1014341-11	WIRE, ELECTRICAL	5
*	5.5	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELECTRICAL	4
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-24-61P	CONNECTOR	2
	1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/2 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J H [illegible] DATE [illegible] 64
CHECKED A. [illegible] 5 Oct 63
APPROVAL [illegible] 19 Oct 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 24 Oct [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

CABLE ASSEMBLY
W8
OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020021
SCALE 1/1
SHEET 1 OF 1

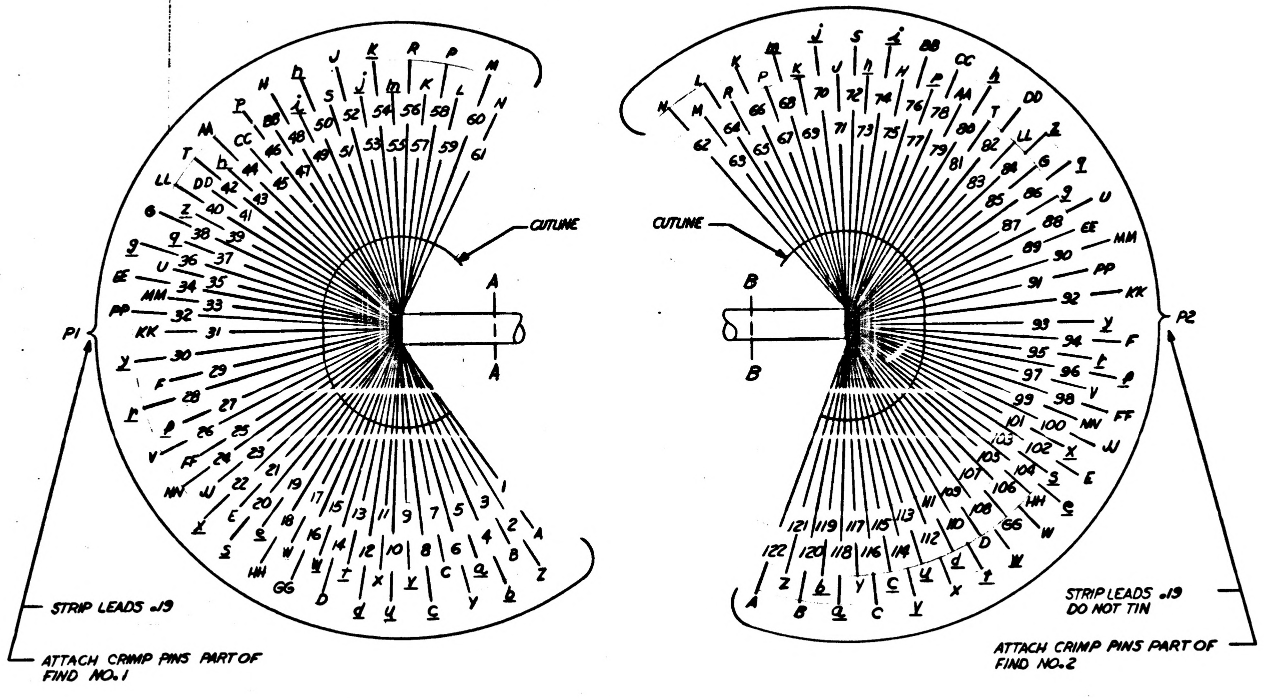
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

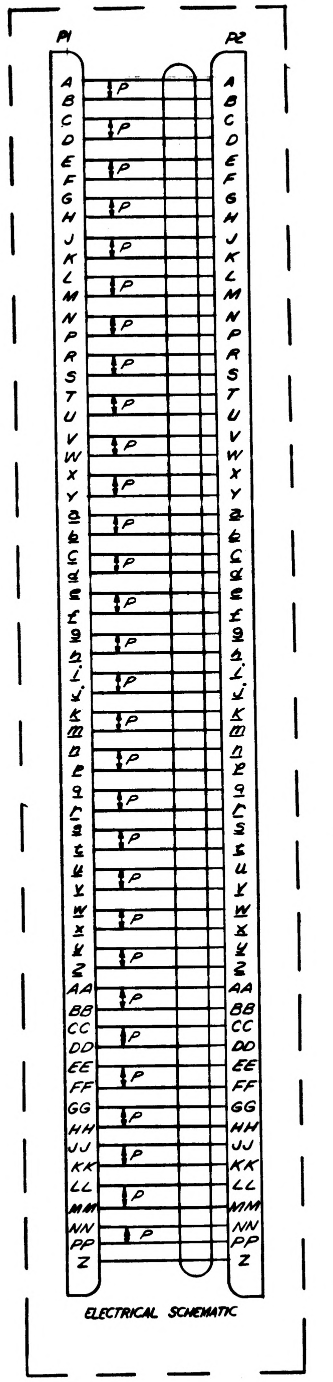
1020021 B

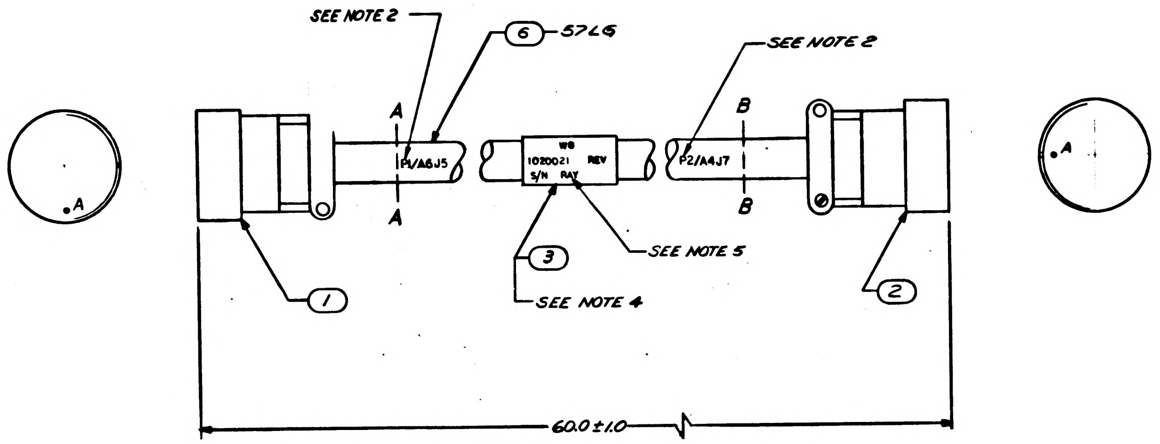
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 2438		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	1	BLK	22	5	122	
	3	WHT			120	
	7	BLK	22	5	116	
	14	WHT			109	
	21	BLK	22	5	102	
	29	WHT			94	
	38	BLK	22	5	85	
	48	WHT			75	
	52	BLK	22	5	71	
	57	WHT			66	
	59	BLK	22	5	64	
	60	WHT			63	
	61	BLK	22	5	62	
	58	WHT			67	
	56	BLK	22	5	65	
	51	WHT			72	
	42	BLK	22	5	81	
	35	WHT			88	
	26	BLK	22	5	97	
	17	WHT			106	
	11	BLK	22	5	112	
	6	WHT			117	
	5	BLK	22	5	118	
	4	WHT			119	
	8	BLK	22	5	115	
	12	WHT			111	
	19	BLK	22	5	104	
	27	WHT			96	
	36	BLK	22	5	87	
	43	WHT			80	
	49	BLK	22	5	74	
	53	WHT			70	
	54	BLK	22	5	69	
	55	WHT			68	
	50	BLK	22	5	73	
	46	WHT			77	
	37	BLK	22	5	86	
	28	WHT			95	
	20	BLK	22	5	103	
	13	WHT			110	
	10	BLK	22	5	113	
	9	WHT			114	
	15	BLK	22	5	108	
	22	WHT			101	
	30	BLK	22	5	93	
	39	WHT			84	
	44	BLK	22	5	79	
	47	WHT			76	
	45	BLK	22	5	78	
	41	WHT			82	
	34	BLK	22	5	89	
	25	WHT			98	
	16	BLK	22	5	107	
	18	WHT			105	
	23	BLK	22	5	100	
	31	WHT			92	
	40	BLK	22	5	83	
	33	WHT			90	
	24	BLK	22	5	99	
	32	WHT			91	
	2	BLK	22	4	121	


CUTLINE
A
A
P1
STRIP LEADS .19
ATTACH CRIMP PINS PART OF FIND NO.1
CUTLINE
B
B
P2
STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO.2


P1
P2
P
ELECTRICAL SCHEMATIC


SEE NOTE 2
6
57LG
SEE NOTE 2
A
A
P1/A6J5
W8
1020021 REV
S/N RAY
P2/A4J7
B
B
3
SEE NOTE 5
SEE NOTE 4
1
2
A
A
60.0±1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0438 DATE 24 Oct 63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM U, GRADE CLASS I CATERGORY I, FOR FIND NO.6 AWG 5/8
4. BOND FIND NO.3 USING TETRAHYDROFURAN WITH 10% POLYVINAL CHLORIDE.
5. MARK .08 HIGH BLACK PER ND 1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	SEE NOTE 3	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	ND1002181 TYPE I CL I	WIRE, ELECTRICAL, AWG 22 BLK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-24-61P	CONNECTOR	2
1	MS3126F-24-61PW	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J.H. Daul DATE 3 Oct 63
CHECKED A. Cagian 5 Oct 63
APPROVAL H. M. ... 14 Oct 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W8
AGC/CTS OPERATION CONSOLE

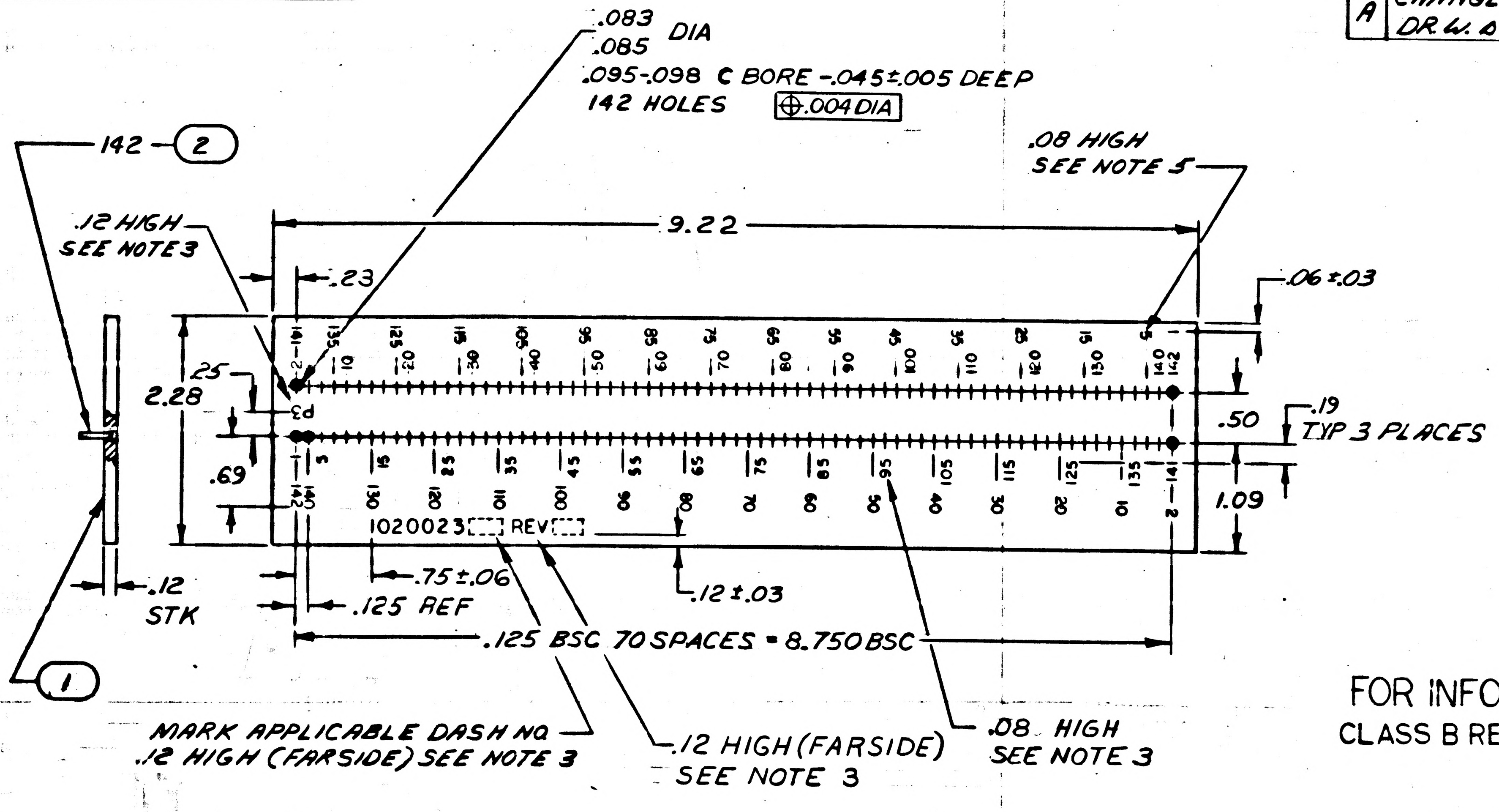
CODE IDENT NO	SIZE	NASA DRAWING NO.
	J	1020021
SCALE 1/1	WT	SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04134	10/24/63	
A	CHANGED PER TDRR 07242 DR. W. Dunn CHK. [illegible] APPD. J. Curley	10 APR 64	KEG



.083 DIA
.085
.095-.098 C BORE -.045±.005 DEEP
142 HOLES
⊕ .004 DIA
142 — ②
.08 HIGH SEE NOTE 5
.12 HIGH SEE NOTE 3
9.22
.23
.06±.03
.25
2.28
P3
.50
.19 TYP 3 PLACES
.69
1.09
1020023 REV
.12 STK
.75±.06
.125 REF
.12±.03
.125 BSC 70 SPACES = 8.750 BSC
①
MARK APPLICABLE DASH NO. .12 HIGH (FARSIDE) SEE NOTE 3
.12 HIGH (FARSIDE) SEE NOTE 3
.08 HIGH SEE NOTE 3

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04134 DATE 10/24/63

REV STATUS OF ASSY	
PART NO.	REV SYM
1020023-2	A
1020023-3	A

-2 NOTES:

1. MATL: BLACK PHENOLIC TYPE FBE PER MIL-P-15035
2. REMOVE BURRS AND SHARP EDGES
3. MARK INNER ROWS WHITE CHARACTERS PER ND1002019
4. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
5. MARK OUTER ROWS YELLOW CHARACTERS PER ND1002019

-3 NOTES

1. SAME AS 1020023-2, EXCEPT NO YELLOW MARKING

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
142	142	1006855	CONTACT, ELECT. SOCKET	2
1	1	1020023-1	BOARD	1
-3	-2	LIST OF MATERIALS		

NEXT ASSY	USED ON
1020033	1014465
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 27 Aug 63
CHECKED J. Curley 13 SEPT. 63
APPROVAL H. Morse 9 OCT 63
APPROVAL J. [illegible] 4 Oct 63
APPROVAL J. J. Pendleton 10/4/63
NASA APPROVAL [illegible] 10/17/63
MIT APPROVAL [illegible] 10/4/63
MIT APPROVAL [illegible] 24 Oct 62

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL BOARD,
TEST POINT

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020023
SCALE 1/1
WT
SHEET 1 OF 1

1020023

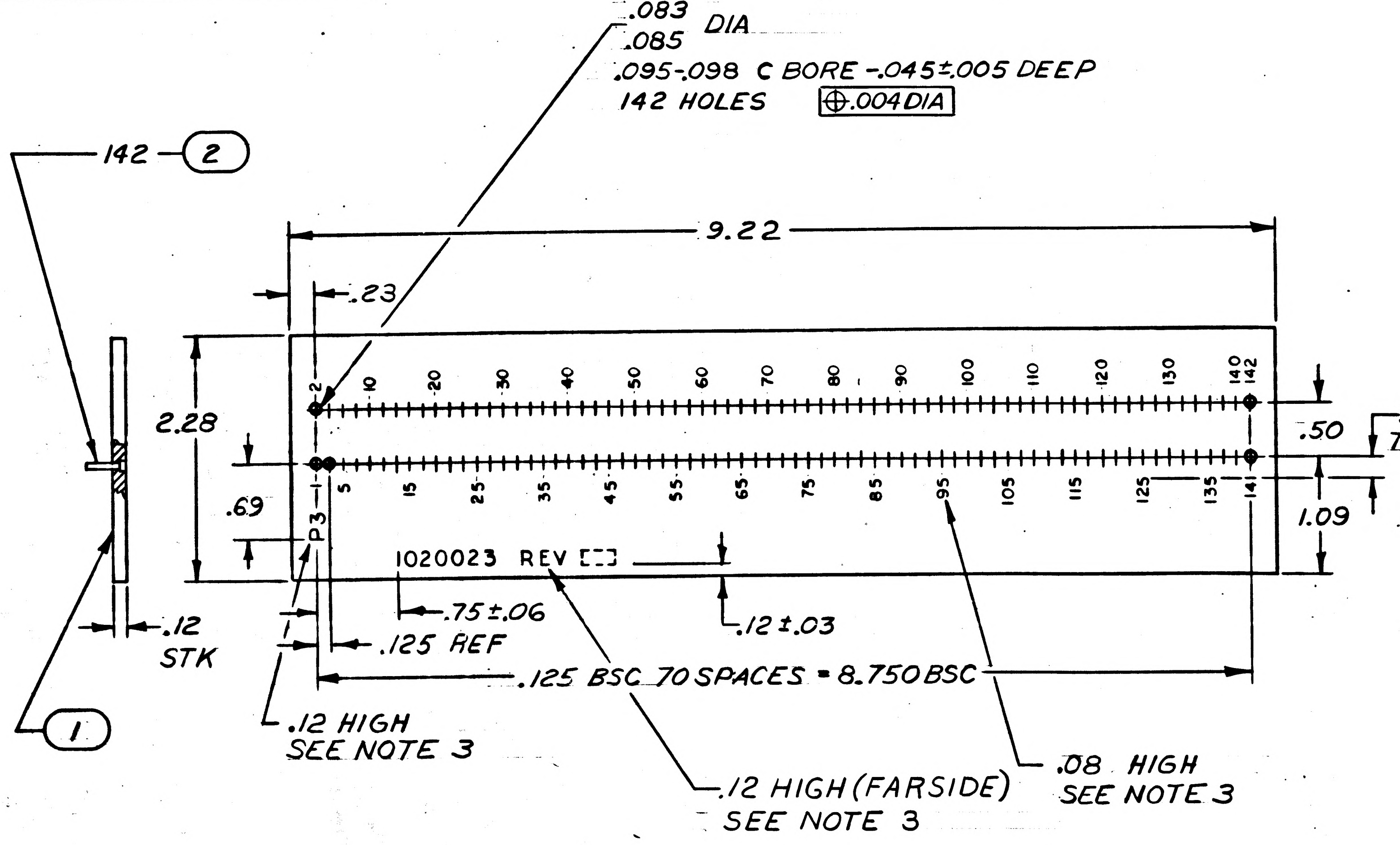
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04/34	10/24/63	


.083
.085 DIA
.095-.098 C BORE -.045±.005 DEEP
142 HOLES ⊕.004 DIA
142 — ②
9.22
.23
2.28
.69
2
10
20
30
40
50
60
70
80
90
100
110
120
130
140
142
1
3
5
15
25
35
45
55
65
75
85
95
105
115
125
135
141
P3
.50
.19 TYP
1.09
1020023 REV [ ]
.75±.06
.12±.03
.125 REF
.12 STK
.125 BSC 70 SPACES = 8.750 BSC
①
.12 HIGH SEE NOTE 3
.12 HIGH (FARSIDE) SEE NOTE 3
.08 HIGH SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04/34 DATE 10/24/63

NOTES:
1. MATL: BLACK PHENOLIC TYPE FBE PER MIL-P-15035
2. REMOVE BURRS AND SHARP EDGES
3. MARK WHITE CHARACTERS PER ND 1002019
4. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
142	1006855	CONTACT, ELECT. SOCKET	2
1	1020023-1	BOARD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020033	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 27 June 63
CHECKED David Conley 13 Sept. 63
APPROVAL H. Morse 4 Oct 63
APPROVAL J. Yalcich 4 Oct 63
APPROVAL J. J. Pendleton 10/4/63
NASA APPROVAL [illegible] 10/17/63
MIT APPROVAL L. Jedinian 10/9/63
MIT APPROVAL W. Kupfer 24 Oct 62

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

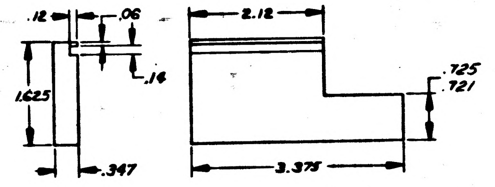
TERMINAL BOARD,
TEST. POINT

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020023
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

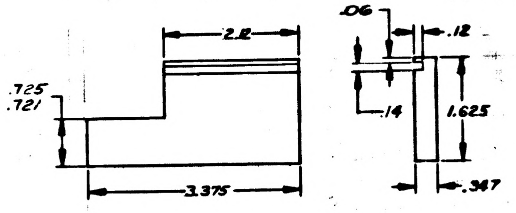
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	[illegible]	[illegible]
A	CLASS II CHANGE PER RD R5624A DR [illegible] CHK W.J. [illegible]	3 JAN 64	[illegible]
B	CHANGED PER TDRR 07248 DR [illegible] CHK [illegible] APPD [illegible]	[illegible] APR 64	NEB


.12
.06
.14
1.625
2.12
.725
.721
.347
3.375

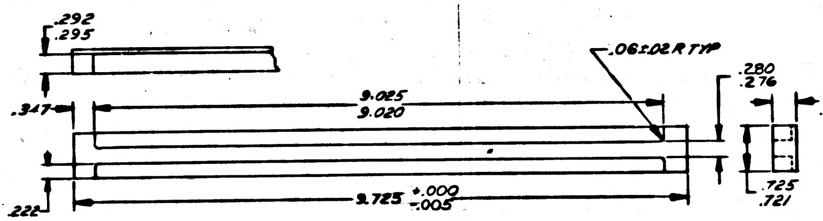
SIDE R.H.
1020027-1

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES


2.2
.06
.12
.725
.721
.14
1.625
3.375
.347

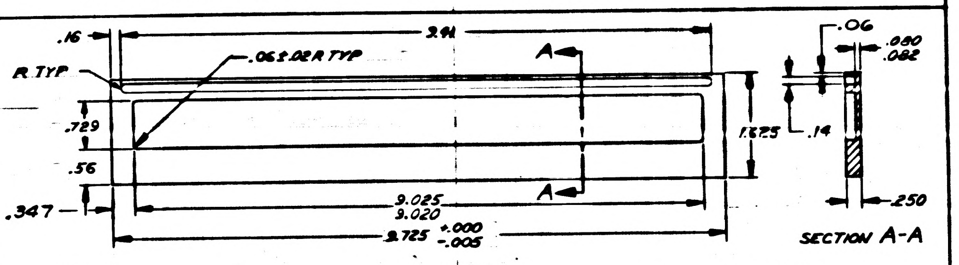
SIDE L.H.
1020027-2

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES


.292
.295
.06±.02 R TYP
.280
.276
.377
.375
.347
9.025
9.020
.725
.721
.222
9.725 +.000 -.005

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

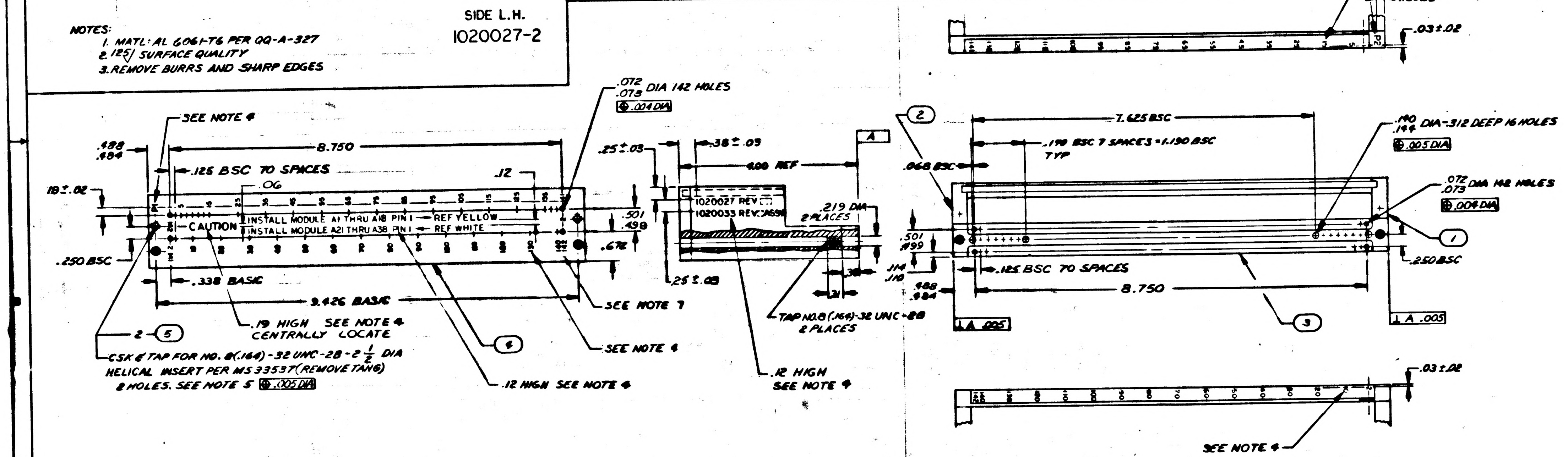
CONNECTOR
1020027-3


.16
3.91
A
.06
.080
.082
R TYP
.06±.02 R TYP
.729
1.375
.14
.56
A
.347
9.025
9.020
9.725 +.000 -.005
.250
SECTION A-A

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

PLATE, CONNECTOR
1020027-4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 12/2/63


SEE NOTE 4
.16±.02
.03±.02
.072
.073 DIA 142 HOLES
.004 DIA
SEE NOTE 4
.488
.484
8.750
.125 BSC 70 SPACES
.12
.06
19±.02
CAUTION
INSTALL MODULE A1 THRU A18 PIN 1 → REF YELLOW
INSTALL MODULE A21 THRU A38 PIN 1 ← REF WHITE
.501
.498
.672
.250 BSC
.338 BASIC
9.426 BASIC
SEE NOTE 7
2 ⑤
.19 HIGH SEE NOTE 4
CENTRALLY LOCATE
④
SEE NOTE 4
CSK & TAP FOR NO. 8(.164)-32 UNC-2B-2 1/2 DIA
HELICAL INSERT PER MS 33537 (REMOVE TANG)
2 HOLES. SEE NOTE 5 .005 DIA
.12 HIGH SEE NOTE 4
.25±.03
.38±.03
4.00 REF
A
1020027 REV
1020033 REV ASSY
.219 DIA
2 PLACES
.25±.03
TAP NO.8 (.164)-32 UNC-2B
2 PLACES
.12 HIGH
SEE NOTE 4
②
.068 BSC
7.625 BSC
.190 BSC 7 SPACES = 1.190 BSC
TYP
.140
.144 DIA-.312 DEEP 16 HOLES
.005 DIA
.072
.073 DIA 142 HOLES
.004 DIA
①
.501
.499
.114
.110
.488
.484
.125 BSC 70 SPACES
8.750
.250 BSC
A .005
③
A .005
.03±.02
SEE NOTE 4

REV STATUS OF PARTS	
PART NO.	REV SYMBOL
1020027-1	—
1020027-2	—
1020027-3	—
1020027-4	—

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08, .12 AND .19 HIGH WHITE CHARACTERS PER ND 1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
7. MARK .08 HIGH YELLOW CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS122199	INSERT, HELICAL COIL	5
1	1020027-4	PLATE, CONNECTOR	4
1	1020027-3	CONNECTOR	3
1	1020027-2	SIDE L.H.	2
1	1020027-1	SIDE R.H.	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020033	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .01 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 16 SEPT 63
APPROVAL [illegible] 4 OCT 63
APPROVAL [illegible] 4 Oct 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME ASSY
STICK EXTENDER NO.1

CODE IDENT NO. —
SIZE F
NASA DRAWING NO 1020027
SCALE 1/1
WT
SHEET 1 OF 1

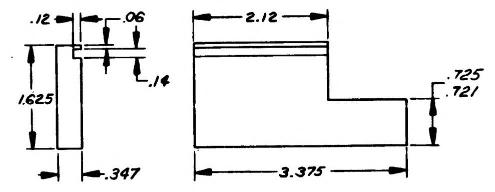
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020027

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

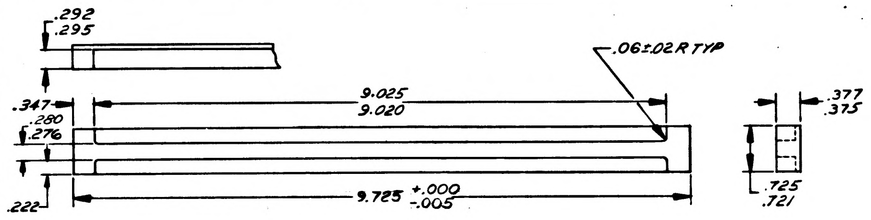
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	


.12
.06
.14
1.625
.347
2.12
.725
.721
3.375

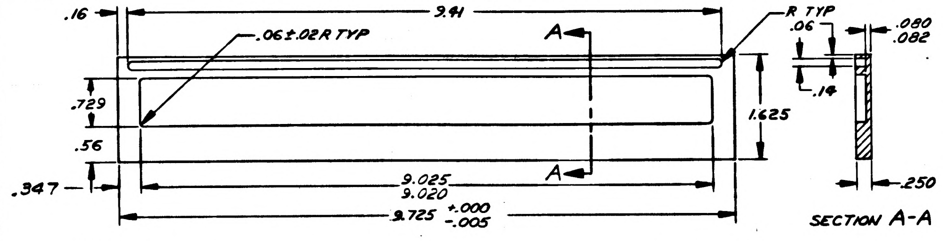
SIDE R.H.
1020027-1

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES


.292
.295
.06±.02 R TYP
.347
.280
.276
9.025
9.020
.377
.375
.222
9.725 +.000 -.005
.725
.721

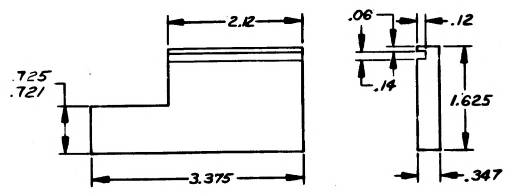
NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

CONNECTOR
1020027-3


.16
9.41
.06±.02 R TYP
A
R TYP
.06
.080
.082
.14
.729
.56
1.625
.347
9.025
9.020
9.725 +.000 -.005
.250
SECTION A-A

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

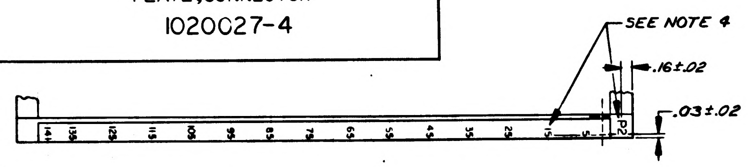
PLATE, CONNECTOR
1020027-4

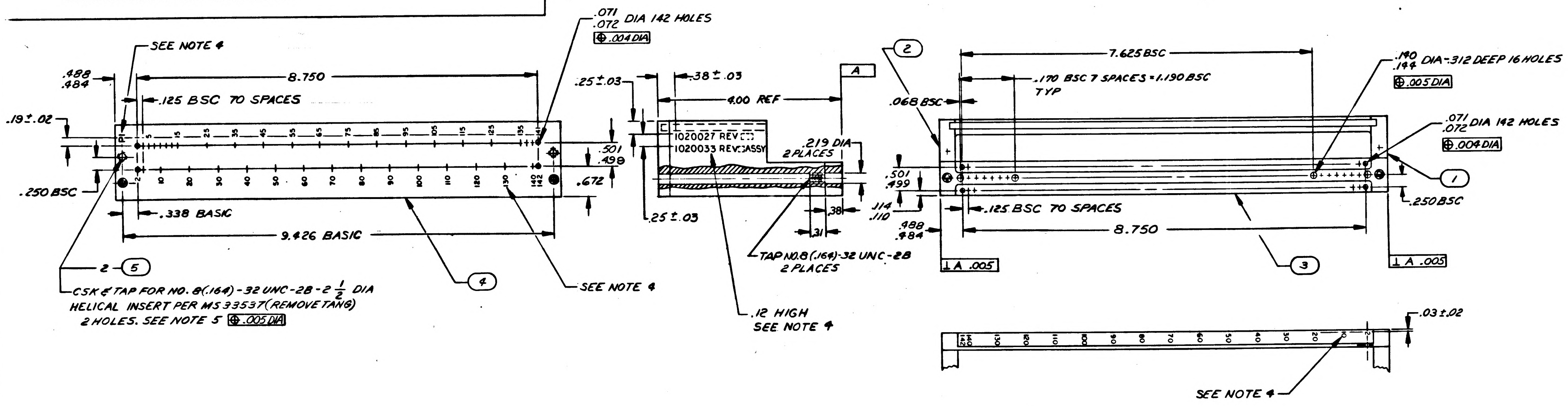

2.12
.06
.12
.725
.721
.14
1.625
3.375
.347

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE L.H.
1020027-2

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63


SEE NOTE 4
.16±.02
.03±.02
P2


.071
.072 DIA 142 HOLES
⊕ .004 DIA
SEE NOTE 4
.488
.484
8.750
.125 BSC 70 SPACES
.19±.02
.501
.498
.672
.250 BSC
.338 BASIC
9.426 BASIC
2
5
4
SEE NOTE 4
CSK & TAP FOR NO. 8(.164)-32 UNC-2B-2 1/2 DIA
HELICAL INSERT PER MS 33537 (REMOVE TANG)
2 HOLES. SEE NOTE 5 ⊕ .005 DIA
.25±.03
.38±.03
4.00 REF
A
1020027 REV
1020033 REV ASSY
.219 DIA
2 PLACES
.501
.499
.114
.110
.488
.484
.31
.38
.25±.03
TAP NO.8 (.164)-32 UNC-2B
2 PLACES
.12 HIGH
SEE NOTE 4
2
.068 BSC
7.625 BSC
.170 BSC 7 SPACES = 1.190 BSC
TYP
.190
.194 DIA-.312 DEEP 16 HOLES
⊕ .005 DIA
.071
.072 DIA 142 HOLES
⊕ .004 DIA
1
.250 BSC
.125 BSC 70 SPACES
8.750
⊥ A .005
3
⊥ A .005
.03±.02
SEE NOTE 4

REV STATUS OF PARTS	
PART NO.	REV SYMBOL
1020027-1	—
1020027-2	—
1020027-3	—
1020027-4	—

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08 AND .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS122199	INSERT, HELICAL COIL	5
1	1020027-4	PLATE, CONNECTOR	4
1	1020027-3	CONNECTOR	3
1	1020027-2	SIDE L.H.	2
1	1020027-1	SIDE R.H.	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020033	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .01 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 20 Aug 63
CHECKED 16 Sept 63
APPROVAL H. Morse 4 Oct 63
APPROVAL 4 Oct 63
APPROVAL
NASA APPROVAL 10/11/63
MIT APPROVAL
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME ASSY
STICK EXTENDER NO.1

CODE IDENT NO —
SIZE F
NASA DRAWING NO 1020027
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

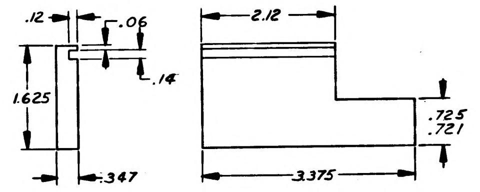
1020027

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

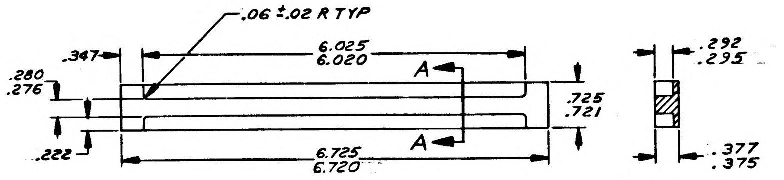
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	WK


.12
.06
.14
1.625
.347
2.12
.725
.721
3.375

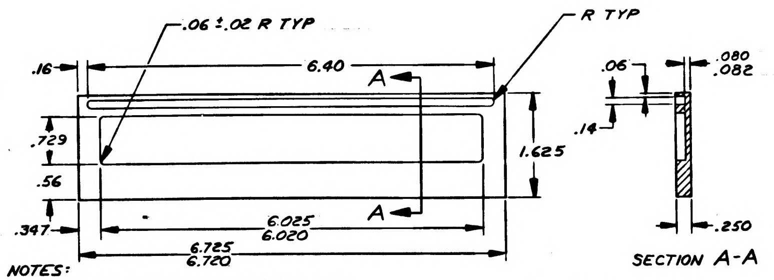
NOTES:
1. MAT L: AL 6061-T6 PER QQ-A-327
2. .125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, R.H.
1020028-1


.06 ± .02 R TYP
.347
6.025
6.020
.280
.276
A
A
.725
.721
.222
6.725
6.720
.292
.295
.377
.375
SECTION A-A

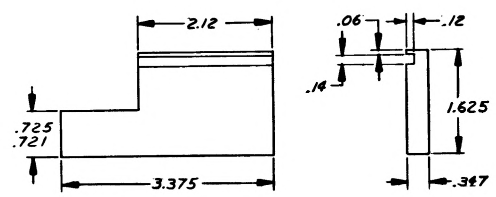
NOTES:
1. MAT L: AL 6061-T6 PER QQ-A-327
2. .125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

CONNECTOR
1020028-3


.06 ± .02 R TYP
R TYP
.16
6.40
A
.729
.56
.347
1.625
A
6.025
6.020
6.725
6.720
.06
.080
.082
.14
.250
SECTION A-A

NOTES:
1. MAT L: AL 6061-T6 PER QQ-A-327
2. .125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

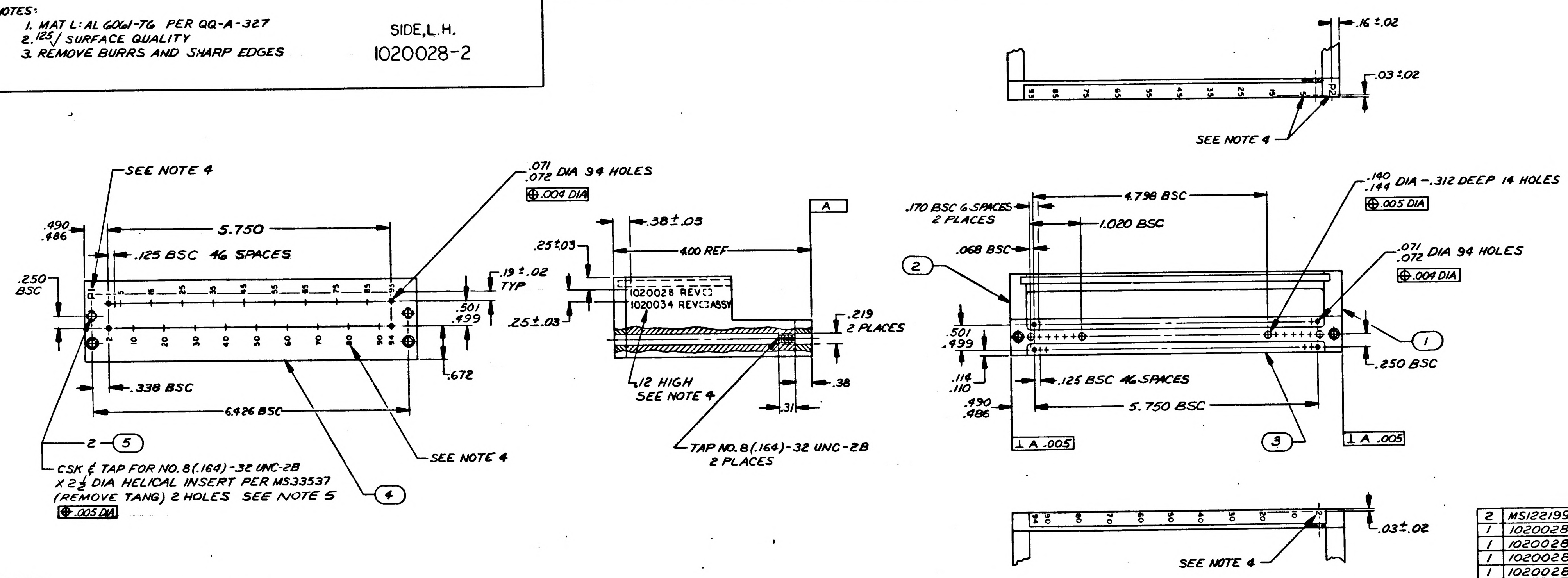
PLATE, CONNECTOR
1020028-4


2.12
.06
.12
.14
.725
.721
1.625
3.375
.347

NOTES:
1. MAT L: AL 6061-T6 PER QQ-A-327
2. .125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, L.H.
1020028-2

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63


.16 ± .02
.03 ± .02
P2
SEE NOTE 4
SEE NOTE 4
.071
.072 DIA 94 HOLES
⊕ .004 DIA
.490
.486
5.750
.125 BSC 46 SPACES
.250 BSC
P1
.19 ± .02 TYP
.501
.499
.672
.338 BSC
6.426 BSC
2 — 5
CSK & TAP FOR NO. 8 (.164)-32 UNC-2B
X 2½ DIA HELICAL INSERT PER MS33537
(REMOVE TANG) 2 HOLES SEE NOTE 5
⊕ .005 DIA
4
SEE NOTE 4
.38 ± .03
A
.25 ± .03
4.00 REF
1020028 REV
1020034 REV ASSY
.25 ± .03
.219
2 PLACES
.12 HIGH
SEE NOTE 4
.38
.31
TAP NO. 8 (.164)-32 UNC-2B
2 PLACES
.170 BSC 6 SPACES
2 PLACES
4.798 BSC
1.020 BSC
.068 BSC
2
.140
.144 DIA – .312 DEEP 14 HOLES
⊕ .005 DIA
.071
.072 DIA 94 HOLES
⊕ .004 DIA
.501
.499
1
.250 BSC
.114
.110
.125 BSC 46 SPACES
.490
.486
5.750 BSC
⊥ A .005
3
⊥ A .005
.03 ± .02
SEE NOTE 4

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08 AND .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO.5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020028-1	—
1020028-2	—
1020028-3	—
1020028-4	—

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS122199	INSERT, HELICAL COIL	5
1	1020028-4	PLATE, CONNECTOR	4
1	1020028-3	CONNECTOR	3
1	1020028-2	SIDE, L.H.	2
1	1020028-1	SIDE, R.H.	1

LIST OF MATERIALS

NEXT ASSY	1020034
USED ON	014465
APPLICATION	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ±.005 .01 ANGLES ±	
DO NOT SCALE THIS DRAWING	
MATERIAL	
HEAT TREATMENT	SEE NOTE
FINAL FINISH	SEE NOTE
RAYTHEON CO. LEXINGTON, MASS	
CONTRACT NO.	NAS 9-498
DRAWN	R.C. Taylor DATE 29 July 63
CHECKED	12 Sept 63
APPROVAL	H. Morse HK 4 Oct 63
APPROVAL	4 Oct 63
APPROVAL	
NASA APPROVAL	10/17/63
MIT APPROVAL	10/17/63
MIT APPROVAL	W. Kupfer 17 Oct 63
MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	FRAME ASSY STICK EXTENDER NO. 2
CODE IDENT NO	—
SIZE	F
NASA DRAWING NO	1020028
SCALE	1/1
WT	
SHEET	1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

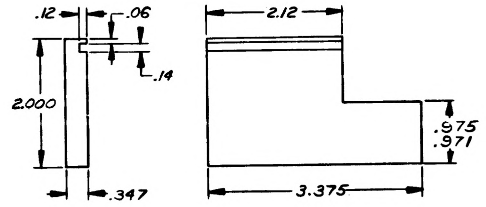
INCHES
PHOTOGRAPHIC SCALE ONLY

1020028

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER. AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

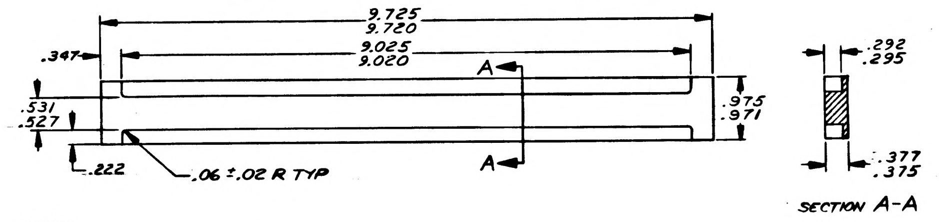
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	W.K.


.12
.06
.14
2.000
.347
2.12
3.375
.975
.971

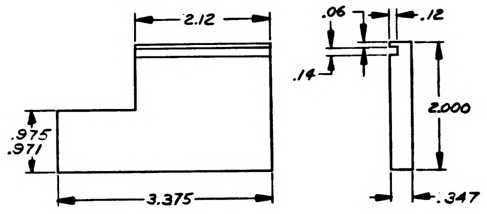
NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, R.H.
1020029-1


9.725
9.720
9.025
9.020
.347
.531
.527
.222
.06 ± .02 R TYP
A
A
.975
.971
.292
.295
.377
.375
SECTION A-A

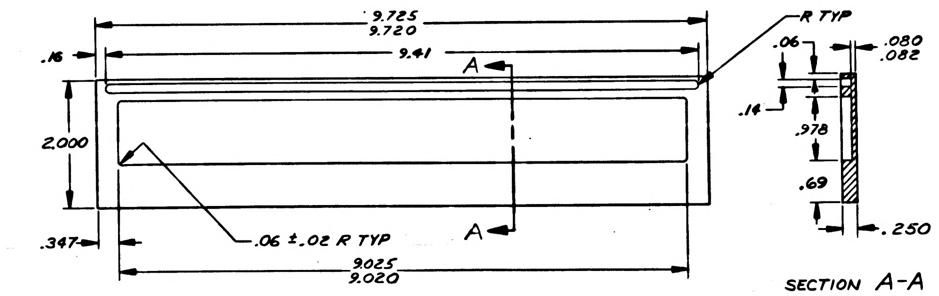
NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

CONNECTOR
1020029-3


2.12
.06
.12
.14
2.000
.975
.971
3.375
.347

NOTES:
1. MATL: AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, L.H.
1020029-2

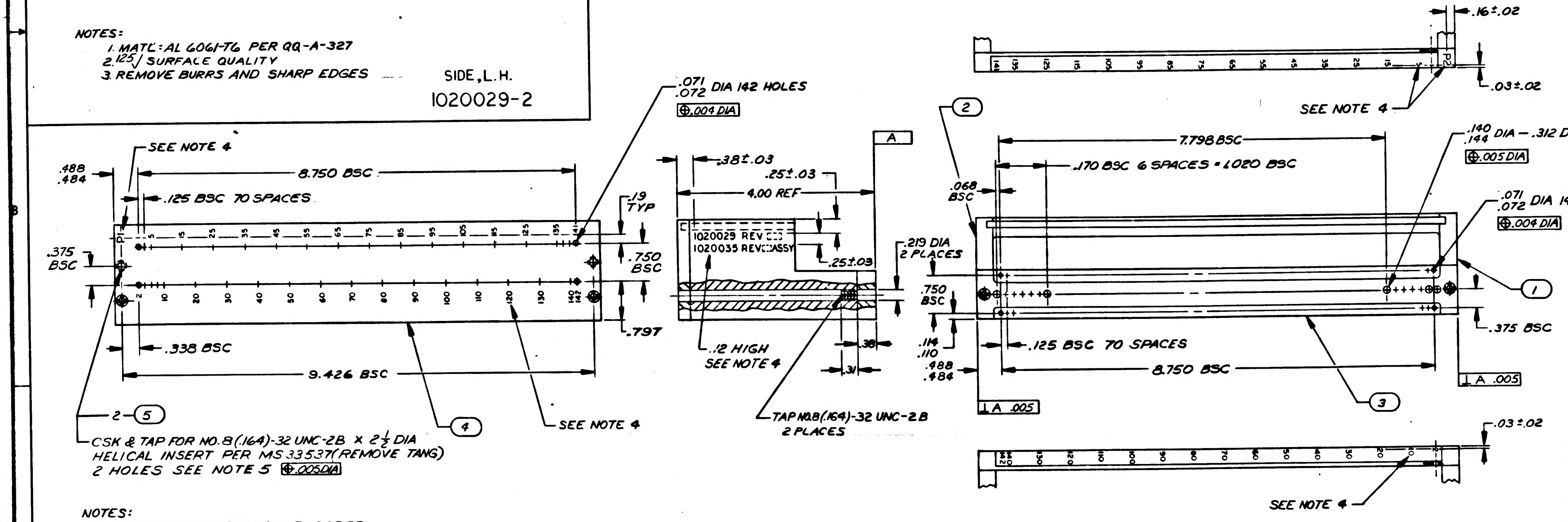

9.725
9.720
9.41
.16
A
A
2.000
.347
.06 ± .02 R TYP
9.025
9.020
R TYP
.06
.080
.082
.14
.978
.69
.250
SECTION A-A

NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

PLATE, CONNECTOR
1020029-4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 11/17/63

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020029-1	—
1020029-2	—
1020029-3	—
1020029-4	—


.071
.072 DIA 142 HOLES
⊕ .004 DIA
SEE NOTE 4
.488
.484
8.750 BSC
.125 BSC 70 SPACES
.19 TYP
.375 BSC
.750 BSC
.797
.338 BSC
9.426 BSC
2 — 5
4
SEE NOTE 4
CSK & TAP FOR NO.8 (.164)-32 UNC-2B X 2½ DIA HELICAL INSERT PER MS33537 (REMOVE TANG) 2 HOLES SEE NOTE 5 ⊕ .005 DIA
A
.38 ± .03
.25 ± .03
4.00 REF
1020029 REV
1020035 REV ASSY
.25 ± .03
.219 DIA 2 PLACES
.12 HIGH SEE NOTE 4
.38
.31
TAP NO.8 (.164)-32 UNC-2B 2 PLACES
.16 ± .02
.03 ± .02
SEE NOTE 4
2
.068 BSC
7.798 BSC
.170 BSC 6 SPACES = 1.020 BSC
.140
.144 DIA — .312 DEEP 14 HOLES
⊕ .005 DIA
.071
.072 DIA 142 HOLES
⊕ .004 DIA
1
.750 BSC
.375 BSC
.114
.110
.488
.484
.125 BSC 70 SPACES
8.750 BSC
⊥ A .005
⊥ A .005
3
.03 ± .02
SEE NOTE 4

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08 AND .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS122199	INSERT, HELICAL COIL	5
1	1020029-4	PLATE, CONNECTOR	4
1	1020029-3	CONNECTOR	3
1	1020029-2	SIDE, L H	2
1	1020029-1	SIDE, RH	1

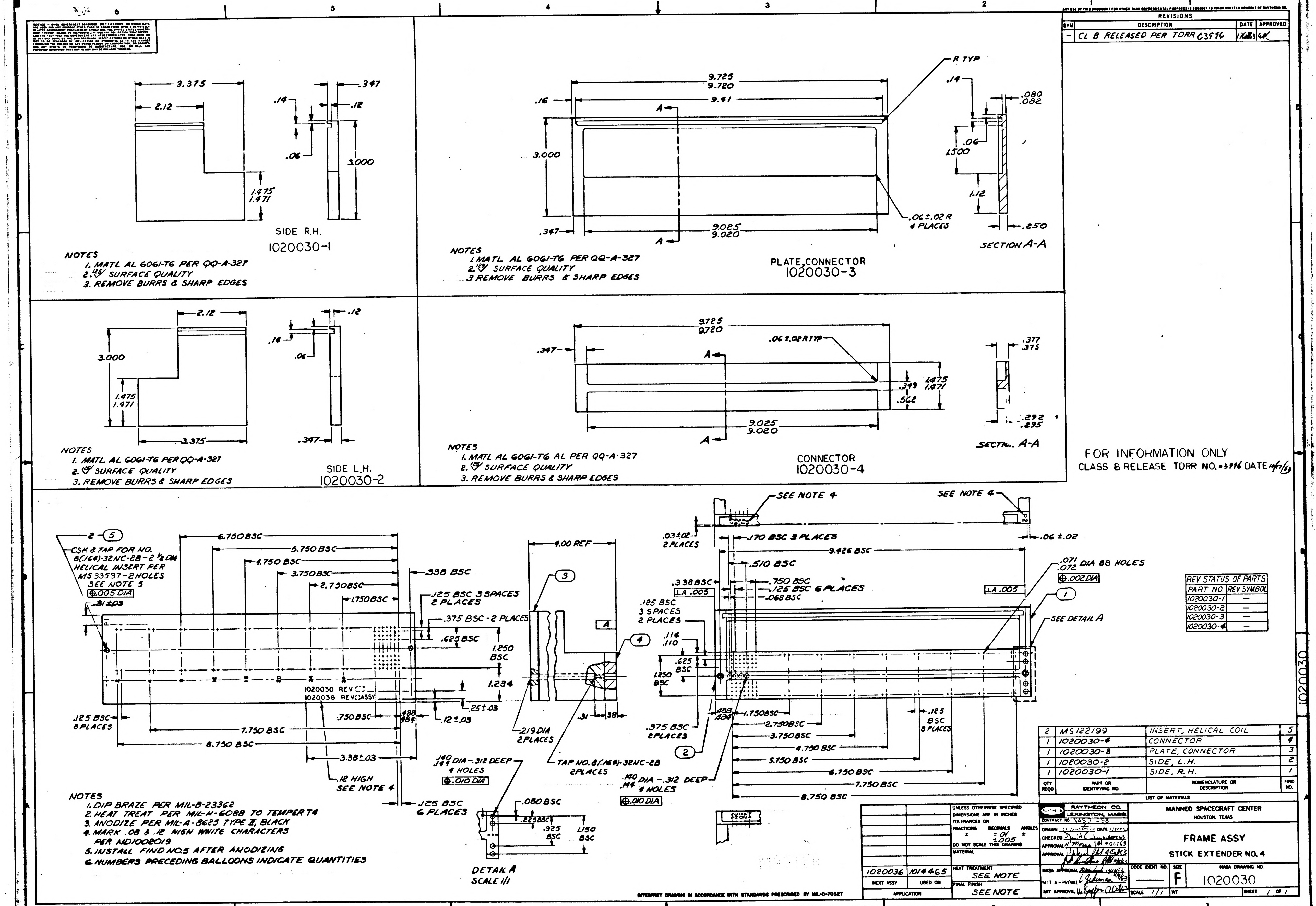
LIST OF MATERIALS

1020035	1014465	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ±.01 .005 ANGLES ± DO NOT SCALE THIS DRAWING	RAYTHEON CO. LEXINGTON, MASS. CONTRACT NO. NAS 9-498	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL	DRAWN R C Taylor DATE 7-26-63	FRAME ASSY STICK EXTENDER NO.3
APPLICATION		HEAT TREATMENT SEE NOTE	CHECKED 12 Sept 63	CODE IDENT NO — SIZE F NASA DRAWING NO 1020029
		FINAL FINISH SEE NOTE	APPROVAL A. Morse 4 Oct 63	SCALE 1/1 WT SHEET 1 OF 1
			APPROVAL 4 Oct 63	
			APPROVAL 14/10/63	
			NASA APPROVAL 11/14/63	
			MIT APPROVAL	
			MIT APPROVAL 17 Oct 63	

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020029

INCHES
PHOTOGRAPHIC SCALE ONLY


SIDE R.H.
1020030-1
3.375
2.12
.347
.14
.12
.06
3.000
1.475
1.471
PLATE, CONNECTOR
1020030-3
9.725
9.720
9.41
.16
R TYP
.06 ±.02 R 4 PLACES
9.025
9.020
SECTION A-A
.080
.082
1.500
1.12
.250
SIDE L.H.
1020030-2
CONNECTOR
1020030-4
.06 ±.02 R TYP
.349
.562
.377
.375
.292
.295
SECTN. A-A
SEE NOTE 4
SEE DETAIL A
9.426 BSC
.510 BSC
.170 BSC 3 PLACES
.071
.072 DIA 88 HOLES
⊕.002 DIA
⊥A .005
6.750 BSC
5.750 BSC
4.750 BSC
3.750 BSC
2.750 BSC
1.750 BSC
7.750 BSC
8.750 BSC
.125 BSC 8 PLACES
3.38 ±.03
.12 HIGH SEE NOTE 4
4.00 REF
.219 DIA 2 PLACES
TAP NO. 8(.164)-32NC-2B 2 PLACES
.140
.144 DIA - .312 DEEP 4 HOLES
⊕.010 DIA
1020030 REV
1020036 REV ASSY
DETAIL A
SCALE 1/1
.050 BSC
.225 BSC
.925 BSC
1.150 BSC

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	1X63	WK

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SIDE R.H.
1020030-1

NOTES
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

PLATE, CONNECTOR
1020030-3

NOTES
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

SIDE L.H.
1020030-2

NOTES
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

CONNECTOR
1020030-4

NOTES
1. MATL AL 6061-T6 AL PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

2 ⑤ CSK & TAP FOR NO. 8(.164)-32NC-2B-2 1/2 DIA HELICAL INSERT PER MS 33537-2 HOLES SEE NOTE 5 ⊕.005 DIA

NOTES
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625 TYPE II, BLACK
4. MARK .08 & .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

REV STATUS OF PARTS

PART NO.	REV SYMBOL
1020030-1	—
1020030-2	—
1020030-3	—
1020030-4	—

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	MS122199	INSERT, HELICAL COIL	5
1	1020030-4	CONNECTOR	4
1	1020030-3	PLATE, CONNECTOR	3
1	1020030-2	SIDE, L.H.	2
1	1020030-1	SIDE, R.H.	1

NEXT ASSY	USED ON
1020036	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.01 ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 13 SEPT 63
CHECKED David [illegible] 11 SEPT 63
APPROVAL H. Morse 4 OCT 63
APPROVAL [illegible] 4 OCT 63
NASA APPROVAL [illegible] 10/17/63
MIT APPROVAL L. Johnson 10/14/63
MIT APPROVAL W. [illegible] 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME ASSY
STICK EXTENDER NO. 4

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020030
SCALE 1/1
WT
SHEET 1 OF 1

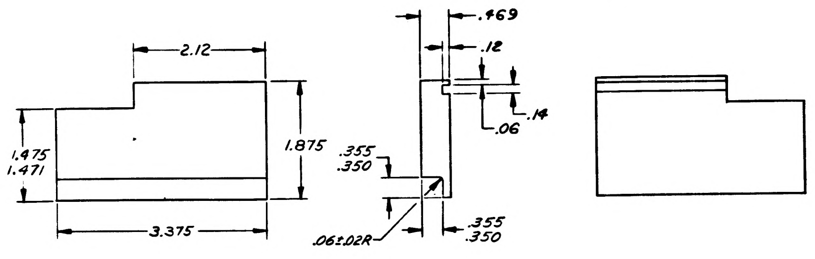
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

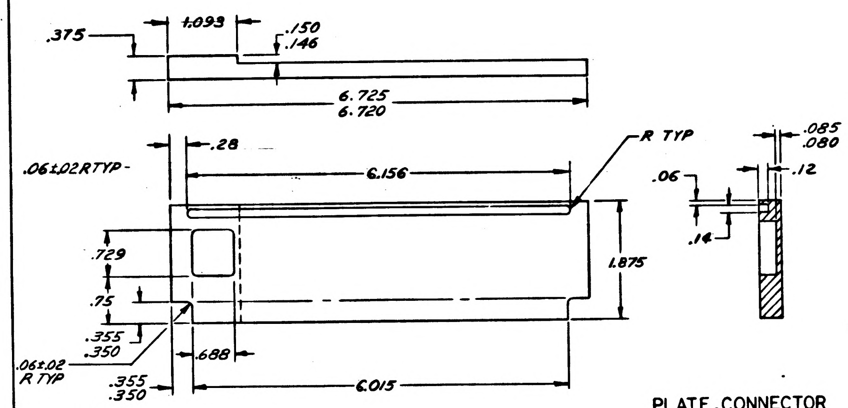
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]


.469
.12
.14
.06
2.12
1.875
1.475
1.471
.355
.350
.355
.350
3.375
.06±.02R

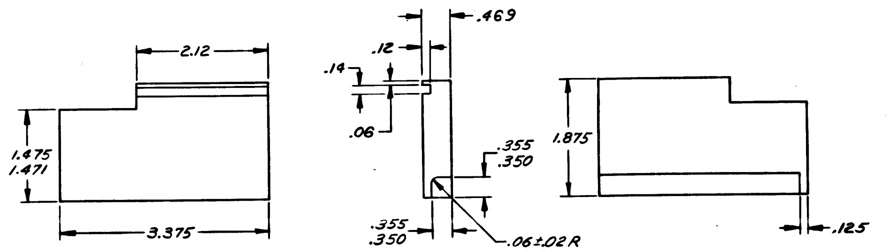
NOTES
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, R.H.
1020031-1


.375
1.093
.150
.146
6.725
6.720
.06±.02R TYP
.28
6.156
R TYP
.085
.080
.06
.12
.14
.729
.75
1.875
.355
.350
.688
.06±.02 R TYP
.355
.350
6.015

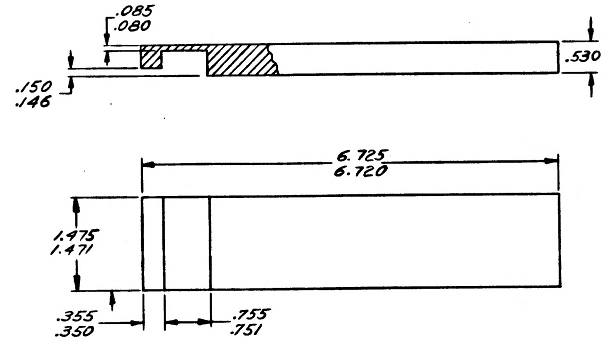
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

PLATE, CONNECTOR
1020031-3


2.12
.469
.12
.14
.06
.355
.350
1.875
1.475
1.471
3.375
.355
.350
.06±.02R
.125

NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

SIDE, L.H.
1020031-2

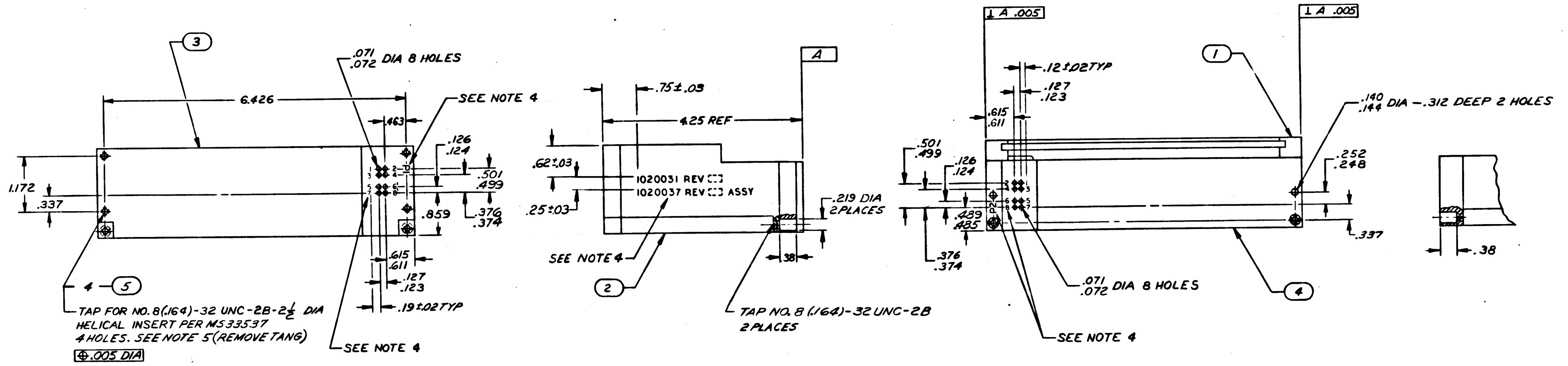

.085
.080
.150
.146
.530
6.725
6.720
1.475
1.471
.355
.350
.755
.751

NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS AND SHARP EDGES

CONNECTOR
1020031-4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 11/17/63

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020031-1	—
1020031-2	—
1020031-3	—
1020031-4	—


3
6.426
.071
.072 DIA 8 HOLES
SEE NOTE 4
.463
.126
.124
.501
.499
1.172
.337
.859
.376
.374
.615
.611
.127
.123
.19±.02TYP
4 – 5
TAP FOR NO.8(.164)-32 UNC-2B-2½ DIA HELICAL INSERT PER MS33537 4 HOLES. SEE NOTE 5 (REMOVE TANG)
⊕ .005 DIA
SEE NOTE 4
A
.75±.03
4.25 REF
.62±.03
1020031 REV
1020037 REV ASSY
.25±.03
.219 DIA 2 PLACES
SEE NOTE 4
.38
2
TAP NO. 8 (.164)-32 UNC-2B 2 PLACES
⊥ A .005
⊥ A .005
.12±.02TYP
.127
.123
1
.615
.611
.501
.499
.140
.144 DIA – .312 DEEP 2 HOLES
.126
.124
.252
.248
.489
.485
.376
.374
.337
.071
.072 DIA 8 HOLES
SEE NOTE 4
4
.38

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08 AND .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
4	MS122199	INSERT, HELICAL COIL	5
1	1020031-4	CONNECTOR	4
1	1020031-3	PLATE, CONNECTOR	3
1	1020031-2	SIDE, L.H.	2
1	1020031-1	SIDE, R.H.	1

LIST OF MATERIALS

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NEXT ASSY	USED ON
1020037	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.01 .005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN R.C. Taylor DATE 8 AUG 63
CHECKED [illegible] 19 SEPT 63
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 10/10/63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME ASSY
STICK EXTENDER NO. 5

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020031
SCALE 1/1
WT
SHEET 1 OF 1

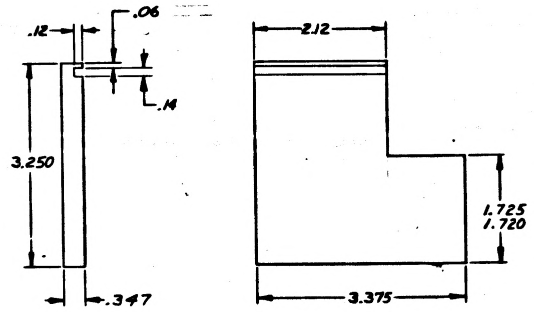
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

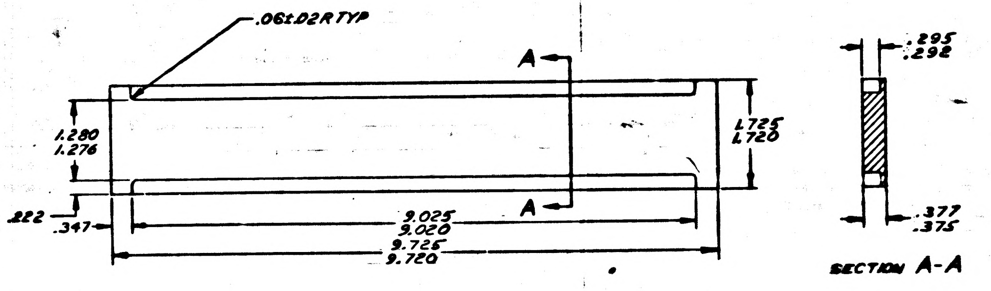
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR C3996	17	
A	CLASS II CHANGE PER RD R5624A DR CHK W. J. Gifford	3 JAN 63	
B	CHANGED PER TDRR 07238 DR S.F. CHK APPD	18 64	KEB


.12
.06
.14
3.250
.347
2.12
1.725
1.720
3.375

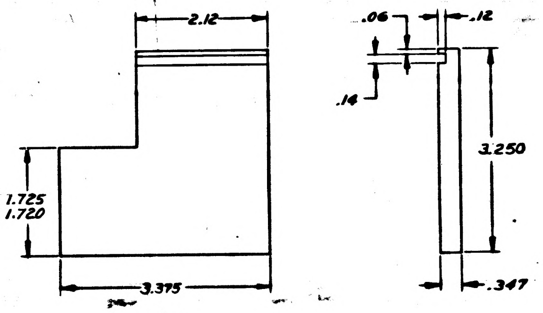
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

SIDE, R.H.
1020032-1


.06±.02R TYP
A
A
1.280
1.276
.222
.347
9.025
9.020
9.725
9.720
1.725
1.720
.295
.292
.377
.375
SECTION A-A

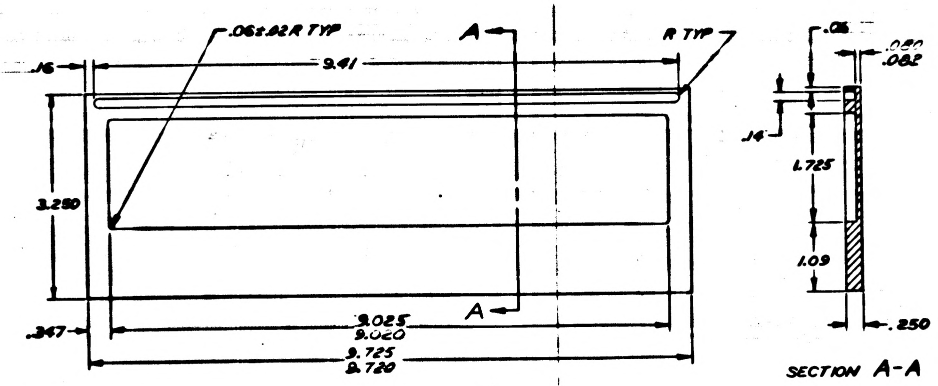
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

CONNECTOR
1020032-3


2.12
.06
.12
.14
3.250
1.725
1.720
3.375
.347

NOTES:
1. MATL AL 6061-T6 AL PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

SIDE, L.H.
1020032-2

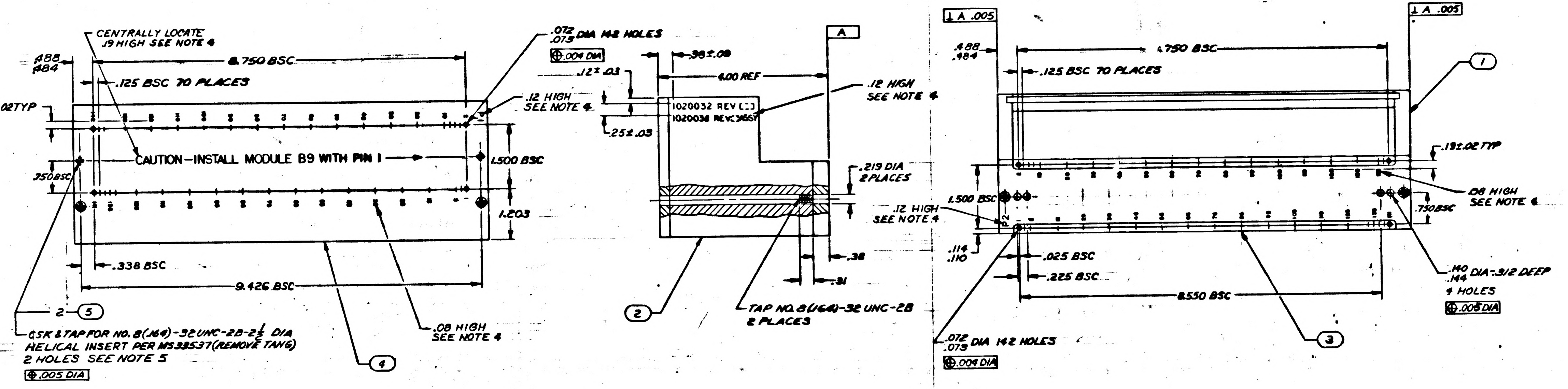

.06±.02R TYP
A
A
R TYP
.16
9.41
3.280
.347
9.025
9.020
9.725
9.720
.06
.080
.082
.14
1.725
1.09
.250
SECTION A-A

NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125/ SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

PLATE, CONNECTOR
1020032-4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR 03996 DATE 1/17/63

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020032-1	—
1020032-2	—
1020032-3	—
1020032-4	—


CENTRALLY LOCATE .19 HIGH SEE NOTE 4
.488
.484
8.750 BSC
.125 BSC 70 PLACES
.19±.02TYP
CAUTION—INSTALL MODULE B9 WITH PIN 1
.750BSC
1.500 BSC
1.203
.338 BSC
9.426 BSC
2 5
CSK & TAP FOR NO. 8(.164)-32UNC-2B-2½ DIA HELICAL INSERT PER MS33537(REMOVE TANG) 2 HOLES SEE NOTE 5
⊕.005 DIA
4
.08 HIGH SEE NOTE 4
.072 .073 DIA 142 HOLES
⊕.004 DIA
.12 HIGH SEE NOTE 4
.12±.03
.25±.03
.38±.08
4.00 REF
A
1020032 REV [ ]
1020038 REV ASSY
.12 HIGH SEE NOTE 4
.219 DIA 2 PLACES
.38
.31
2
TAP NO. 8(.164)-32 UNC-2B 2 PLACES
⊥ A .005
⊥ A .005
.488
.484
4.750 BSC
.125 BSC 70 PLACES
1
.19±.02 TYP
1.500 BSC
.12 HIGH SEE NOTE 4
.08 HIGH SEE NOTE 4
.750BSC
.114
.110
.025 BSC
.225 BSC
8.550 BSC
.140 .144 DIA-.312 DEEP 4 HOLES
⊕.005 DIA
3
.072 .073 DIA 142 HOLES
⊕.004 DIA

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08, .12 & .19 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	MS122199	INSERT, HELICAL COIL	5
1	1020032-4	PLATE, CONNECTOR	4
1	1020032-3	CONNECTOR	3
1	1020032-2	SIDE, L.H.	2
1	1020032-1	SIDE, R.H.	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020038	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.01 .005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 2 AUG 63
CHECKED
APPROVAL H. Morse 4 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME ASSY
STICK EXTENDER NO. 6

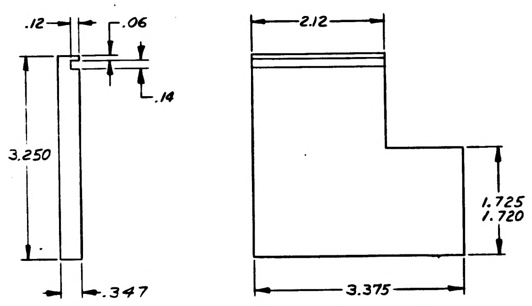
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020032
SCALE 1/1
WT
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO

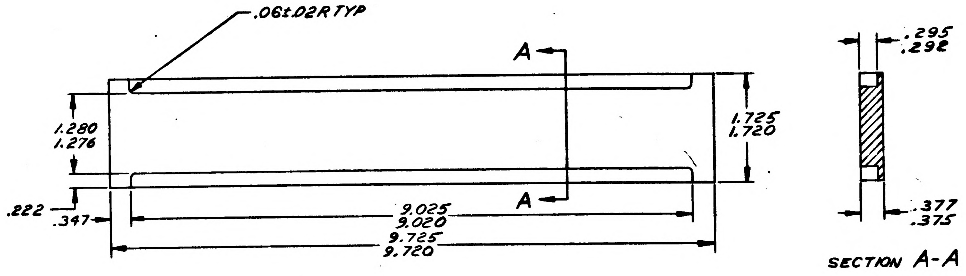
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996		


.12
.06
.14
2.12
3.250
1.725
1.720
.347
3.375

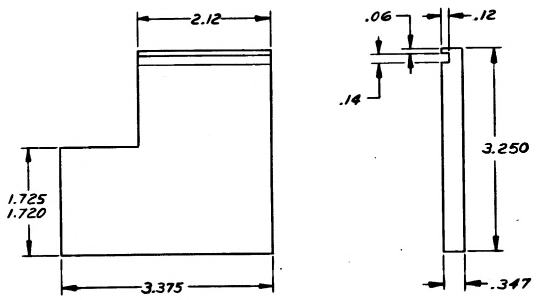
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 surface quality
3. REMOVE BURRS & SHARP EDGES

SIDE, R.H.
1020032-1


.06±.02R TYP
A
1.280
1.276
.222
.347
9.025
9.020
9.725
9.720
1.725
1.720
.295
.292
.377
.375
SECTION A-A

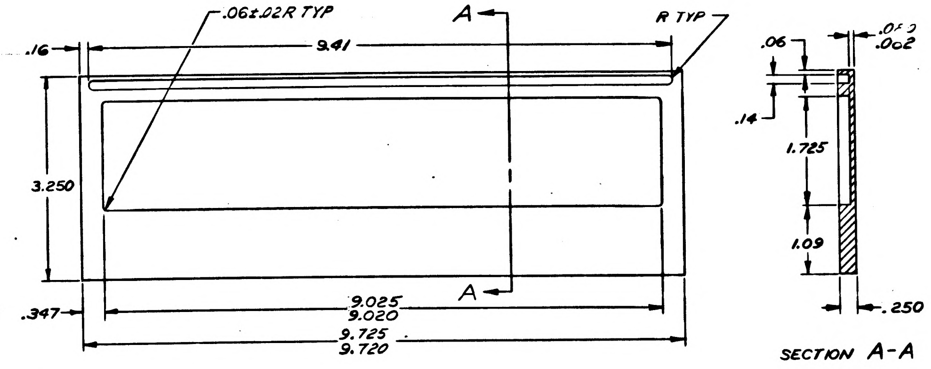
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

CONNECTOR
1020032-3


2.12
.06
.12
.14
3.250
1.725
1.720
3.375
.347

NOTES:
1. MATL AL 6061-T6 AL PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

SIDE, L.H.
1020032-2

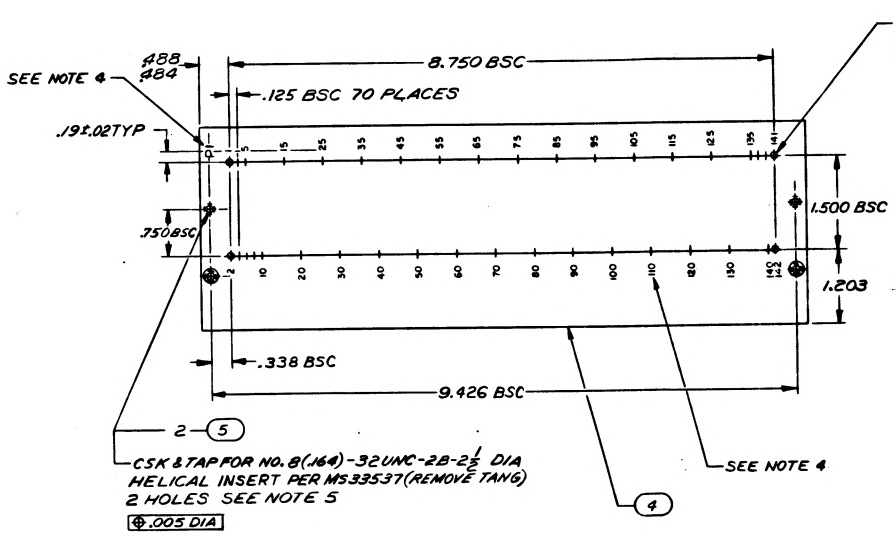

.06±.02R TYP
A
R TYP
.16
9.41
3.250
.347
9.025
9.020
9.725
9.720
.06
.002
.14
1.725
1.09
.250
SECTION A-A

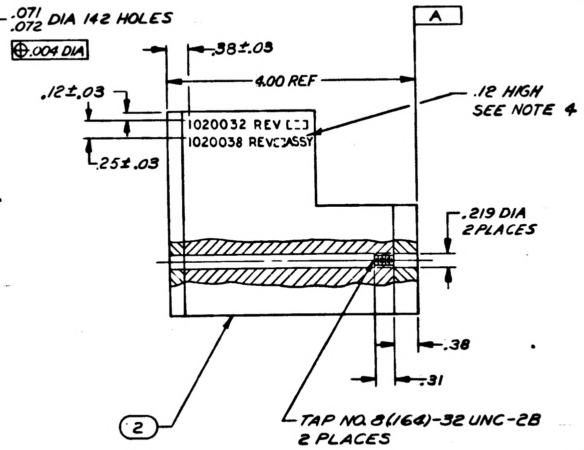
NOTES:
1. MATL AL 6061-T6 PER QQ-A-327
2. 125 SURFACE QUALITY
3. REMOVE BURRS & SHARP EDGES

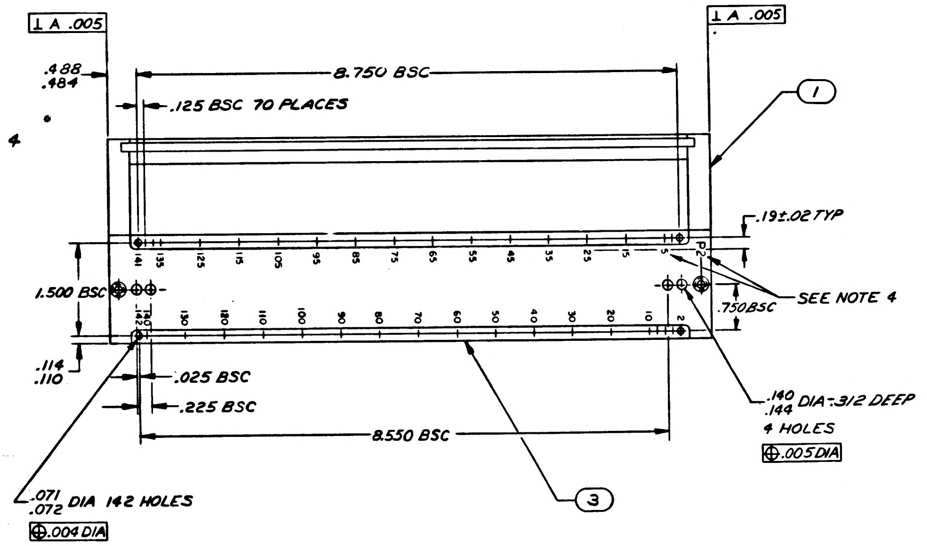
PLATE, CONNECTOR
1020032-4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR 03996 DATE 10/17/63

REV STATUS OF PARTS	
PART NO	REV SYMBOL
1020032-1	—
1020032-2	—
1020032-3	—
1020032-4	—


.488
.484
SEE NOTE 4
8.750 BSC
.125 BSC 70 PLACES
.19±.02TYP
.750BSC
1.500 BSC
1.203
.338 BSC
9.426 BSC
2 – 5
CSK & TAP FOR NO. 8(.164)-32UNC-2B-2½ DIA
HELICAL INSERT PER MS33537(REMOVE TANG)
2 HOLES SEE NOTE 5
⊕ .005 DIA
4
SEE NOTE 4
.071
.072 DIA 142 HOLES
⊕ .004 DIA


A
.38±.03
4.00 REF
.12±.03
.25±.03
1020032 REV
1020038 REV ASSY
.12 HIGH
SEE NOTE 4
.219 DIA
2 PLACES
.38
.31
2
TAP NO. 8(.164)-32 UNC-2B
2 PLACES


⊥ A .005
.488
.484
8.750 BSC
.125 BSC 70 PLACES
1
.19±.02 TYP
1.500 BSC
.750BSC
SEE NOTE 4
.114
.110
.025 BSC
.225 BSC
8.550 BSC
.140
.144 DIA-.312 DEEP
4 HOLES
⊕ .005 DIA
3
.071
.072 DIA 142 HOLES
⊕ .004 DIA

NOTES:
1. DIP BRAZE PER MIL-B-23362
2. HEAT TREAT PER MIL-H-6088 TO TEMPER T4
3. ANODIZE PER MIL-A-8625, TYPE 2, BLACK
4. MARK .08 & .12 HIGH WHITE CHARACTERS PER ND1002019
5. INSTALL FIND NO. 5 AFTER ANODIZING
6. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
2	MS122199	INSERT, HELICAL COIL	5
1	1020032-4	PLATE, CONNECTOR	4
1	1020032-3	CONNECTOR	3
1	1020032-2	SIDE, L.H.	2
1	1020032-1	SIDE, R.H.	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020038	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.01 .005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT SEE NOTE
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN R.C. Taylor DATE 9 AUG 63
CHECKED 16 SEPT 63
APPROVAL H. Morse
APPROVAL
APPROVAL 10/1/63
NASA APPROVAL
MIT APPROVAL 10/4/63
MIT APPROVAL 11 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

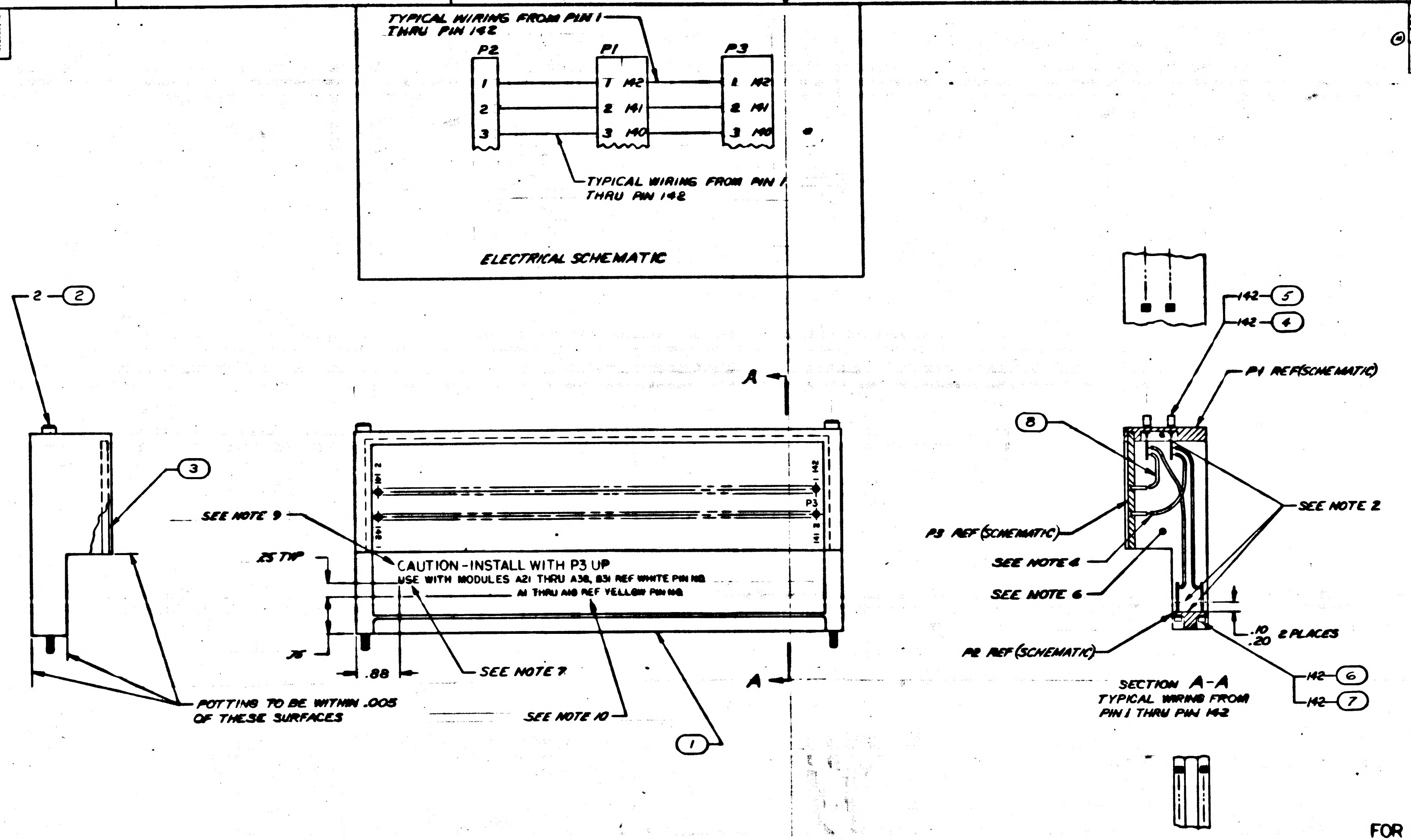
FRAME ASSY
STICK EXTENDER NO. 6

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020032
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


TYPICAL WIRING FROM PIN 1 THRU PIN 142
P2
P1
P3
1
2
3
1 142
2 141
3 140
1 142
2 141
3 140
TYPICAL WIRING FROM PIN 1 THRU PIN 142
ELECTRICAL SCHEMATIC
2 (2)
(3)
SEE NOTE 9
.25 TYP
CAUTION - INSTALL WITH P3 UP
USE WITH MODULES A21 THRU A38, B31 REF WHITE PIN NO.
A1 THRU A18 REF YELLOW PIN NO.
P3
.75
.88
SEE NOTE 7
SEE NOTE 10
(1)
POTTING TO BE WITHIN .005 OF THESE SURFACES
A
A
142 (5)
142 (4)
P1 REF (SCHEMATIC)
(8)
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10
.20 2 PLACES
P2 REF (SCHEMATIC)
142 (6)
142 (7)
SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 142

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	[illegible]	WK
A	CHANGED PER TDRR 07234 DR. W. [illegible] CHK. J.C.J. APPD [illegible]	[illegible]	KEB

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:

1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION & REQ'D TESTS
4. STRIP & TIN FIND NO. 8 TO $^{.06}_{.09}$ LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. MARK .19 HIGH WHITE CHARACTERS PER ND1002019
10. MARK .12 HIGH YELLOW CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	~~9~~
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023-2	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020027	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R C Taylor DATE [illegible]
CHECKED [illegible] 12 Sept 63
APPROVAL W. Moore [illegible] 4 Oct 63
APPROVAL [illegible] 4 Oct 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO.1

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020033
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

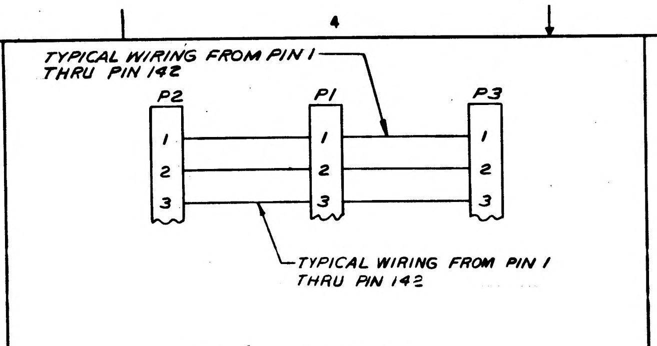
1020033

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

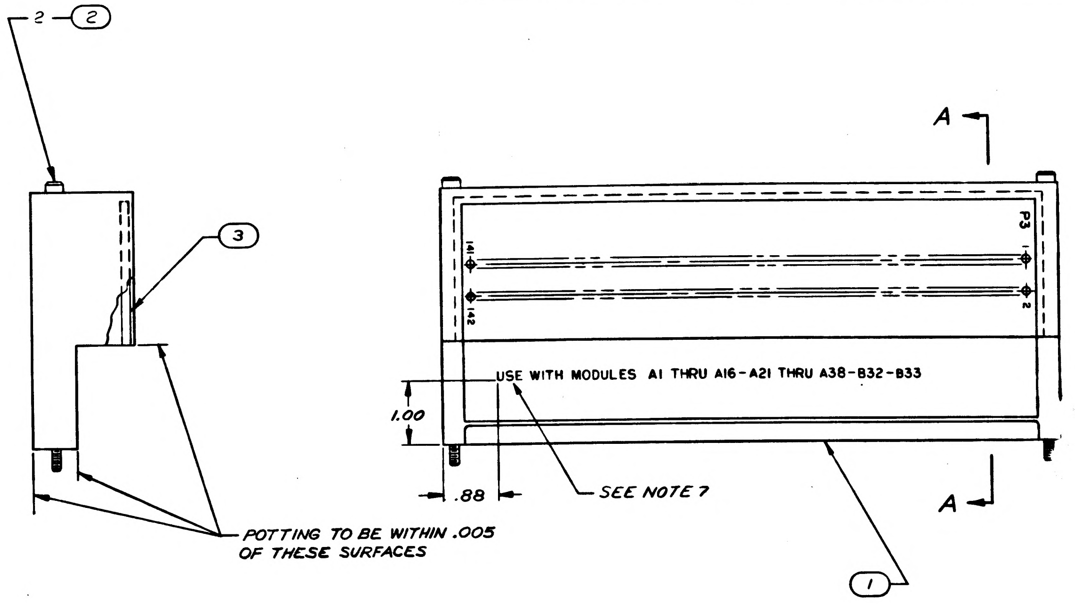
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

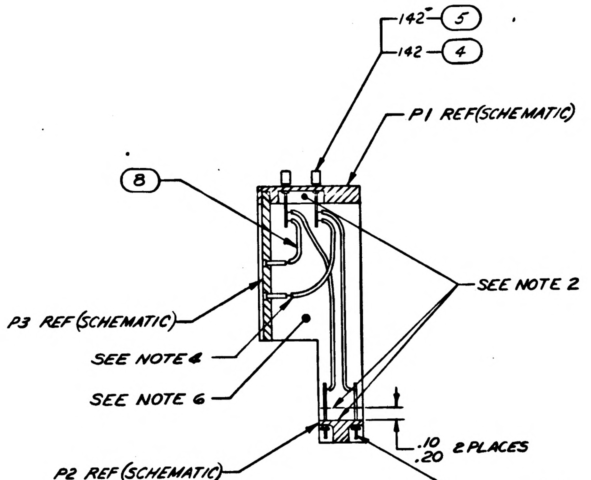
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	WK


TYPICAL WIRING FROM PIN 1 THRU PIN 142
P2
P1
P3
1
2
3
1
2
3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 142

ELECTRICAL SCHEMATIC


2
②
③
A
A
P3
141
142
1
2
USE WITH MODULES A1 THRU A16-A21 THRU A38-B32-B33
1.00
.88
SEE NOTE 7
POTTING TO BE WITHIN .005 OF THESE SURFACES
①


142 ⑤
142 ④
P1 REF(SCHEMATIC)
⑧
SEE NOTE 2
P3 REF(SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10
.20
2 PLACES
P2 REF(SCHEMATIC)
142 ⑥
142 ⑦

SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 142

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:

1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION & REQ D TESTS
4. STRIP & TIN FIND NO. 8 TO $^{.06}_{.09}$ LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183 COLOR BLACK
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXTRELIEVED BODY	2
1	1020027	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R C Taylor DATE 26 June 63
CHECKED [illegible] 12 Sept 63
APPROVAL W. Morse 4 Oct 63
APPROVAL [illegible] 9 Oct 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 1

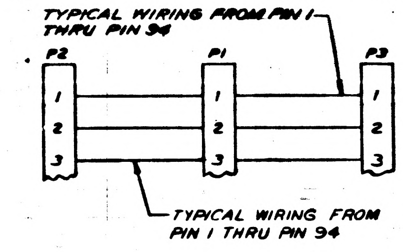
CODE IDENT NO. —— SIZE F NASA DRAWING NO. 1020033
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020033

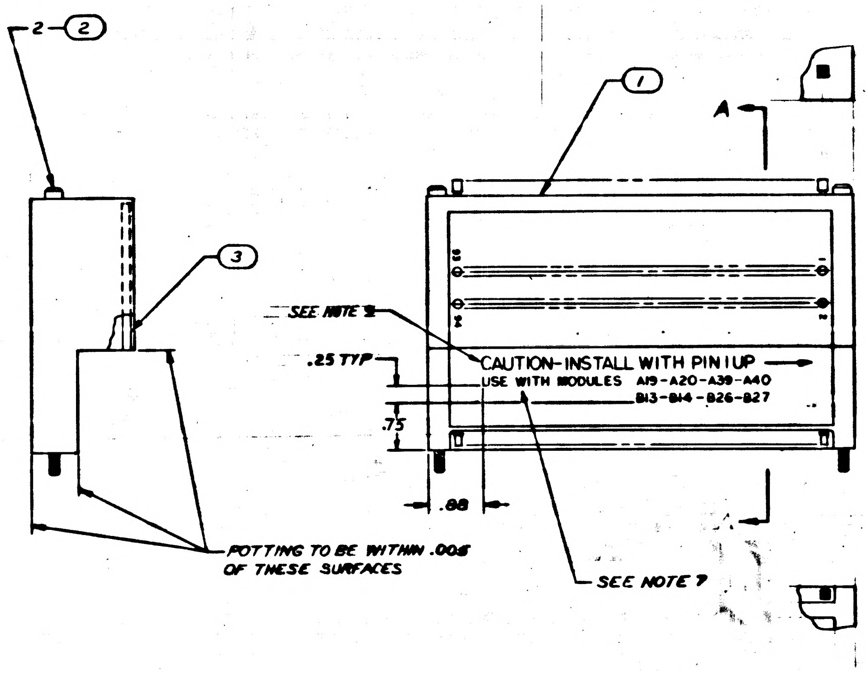
INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	wK
A	CHANGED PER TDRR 07241 DR J.P. Leonard CHK G. Caggana APPD J Conboy	5 Apr 64	HEB

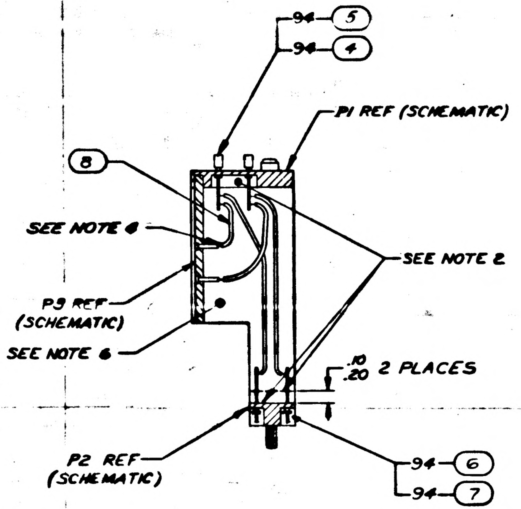


TYPICAL WIRING FROM PIN 1 THRU PIN 94
P2
P1
P3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 94

ELECTRICAL SCHEMATIC



2
2
1
3
A
SEE NOTE 9
.25 TYP
CAUTION-INSTALL WITH PIN 1 UP
USE WITH MODULES A19-A20-A39-A40
B13-B14-B26-B27
.75
.88
POTTING TO BE WITHIN .005 OF THESE SURFACES
SEE NOTE 7



94
5
94
4
P1 REF (SCHEMATIC)
8
SEE NOTE 4
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 6
.10
.20
2 PLACES
P2 REF (SCHEMATIC)
94
6
94
7

SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 94

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:
1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION & REQD TESTS SEE ND1002032
4. STRIP & TIN FIND NO. 8 TO $^{.06}_{.03}$ LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. MARK .19 HIGH WHITE CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006304~~	~~EPOXY RESIN~~	9
A/R	MIL-W-16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	8
94	1006775	INSULATOR, WRAPOST-MALE, MIN	7
94	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
94	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
94	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020024	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020028	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 30 July 63
CHECKED David Carley 13 SEPT 63
APPROVAL A. Moore 9th Oct 63
APPROVAL [illegible] 4 Oct
APPROVAL J. Kupfer [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 10/4/63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 2

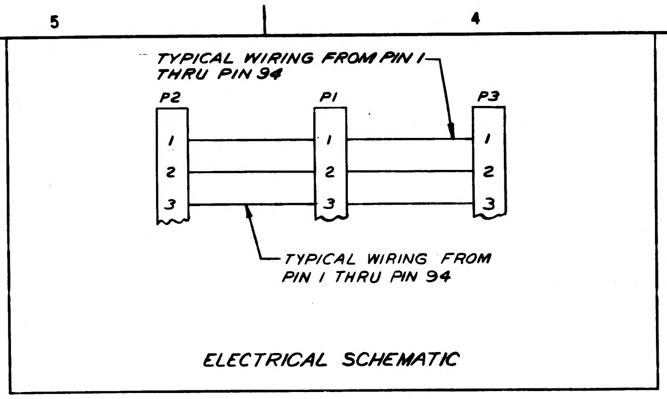
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020034
SCALE 1/1 WT
SHEET 1 OF 1

1020034

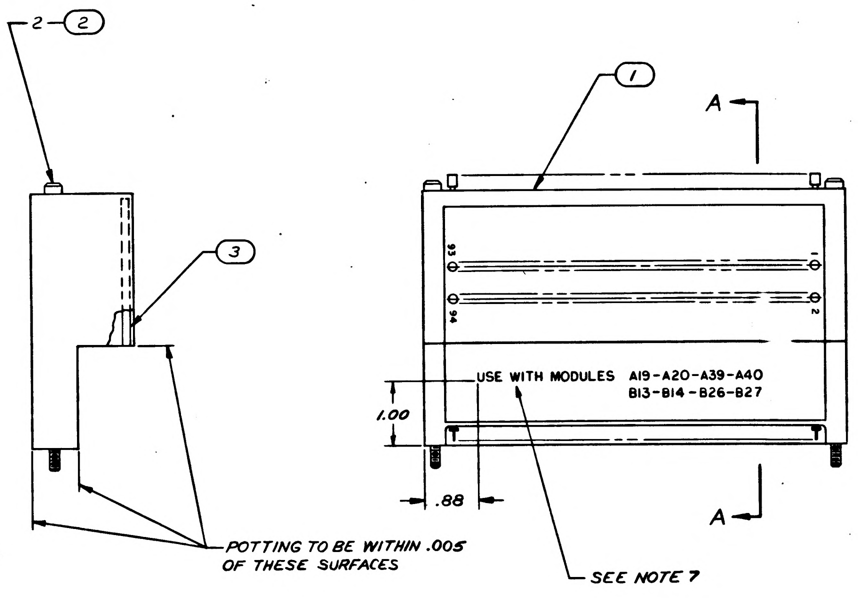
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

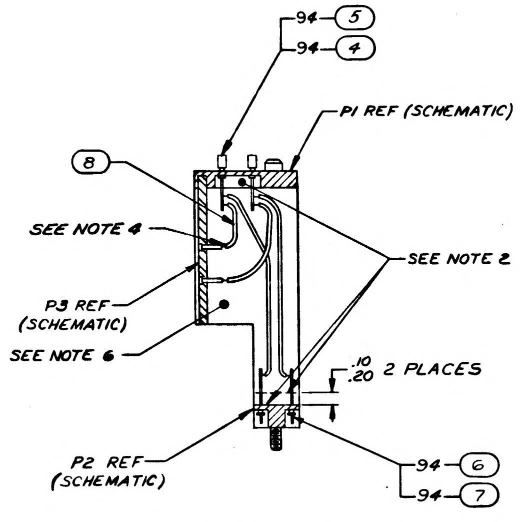
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	12-…	WK


TYPICAL WIRING FROM PIN 1 THRU PIN 94
P2
P1
P3
1
2
3
1
2
3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 94

ELECTRICAL SCHEMATIC


2 – ②
③
①
A
A
94
1
2
94
USE WITH MODULES A19-A20-A39-A40 B13-B14-B26-B27
1.00
.88
POTTING TO BE WITHIN .005 OF THESE SURFACES
SEE NOTE 7


94 – ⑤
94 – ④
P1 REF (SCHEMATIC)
⑧
SEE NOTE 4
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 6
.10 / .20 2 PLACES
P2 REF (SCHEMATIC)
94 – ⑥
94 – ⑦

SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 94

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:
1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION & REQD TESTS SEE ND1002032
4. STRIP & TIN FIND NO. 8 TO $^{.06}_{.09}$ LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183
   COLOR BLACK
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
94	1006775	INSULATOR, WRAPOST-MALE, MIN	7
94	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
94	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
94	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020024	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020028	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 30 July 63
CHECKED 12 SEPT 63
APPROVAL H. Morse
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 10/14/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 2

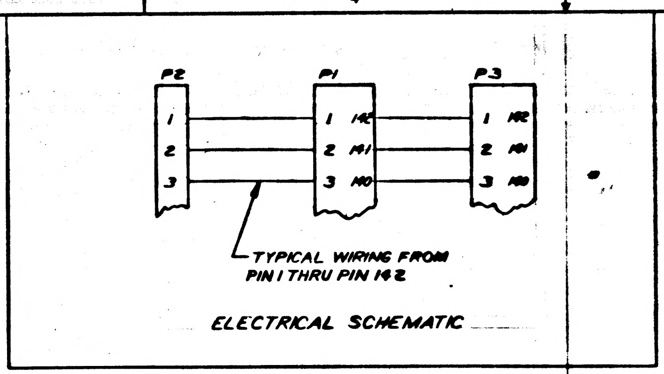
CODE IDENT NO —
SIZE F
NASA DRAWING NO 1020034
SCALE 1/1
WT
SHEET 1 OF 1

1020034

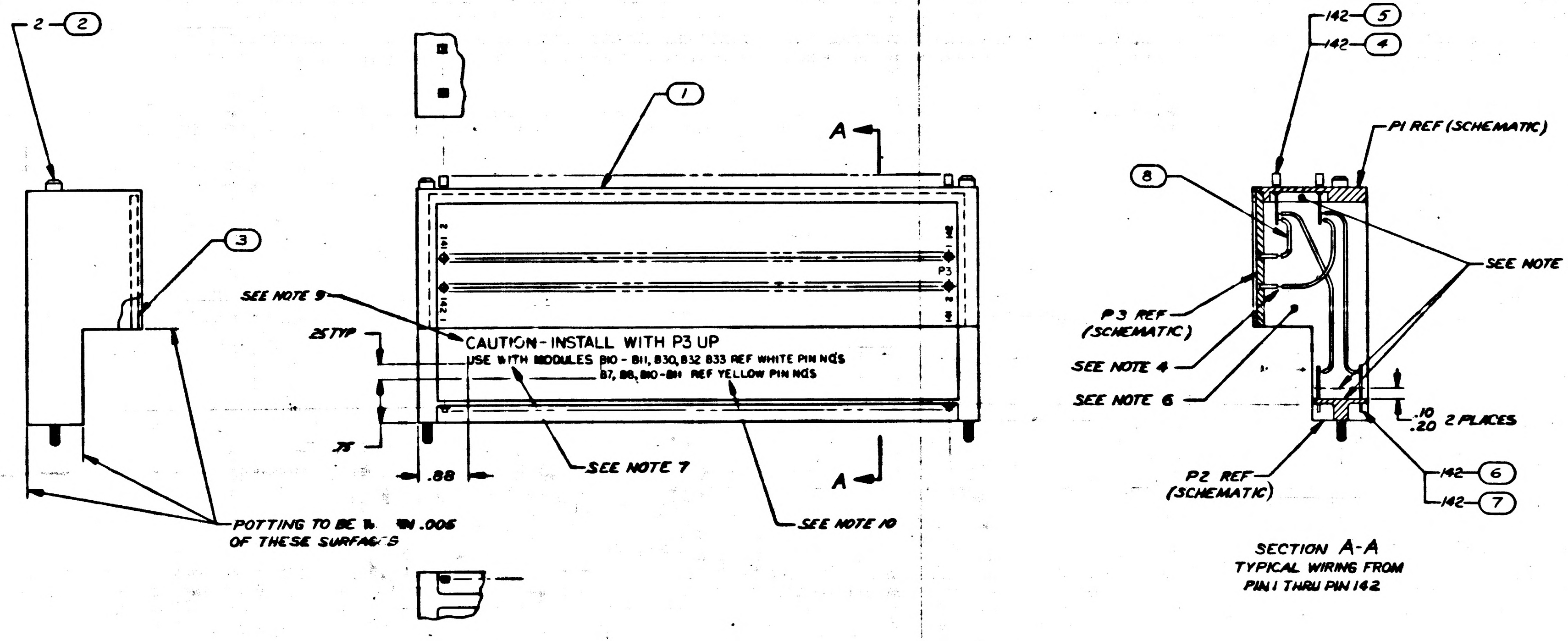
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	[illegible]	
A	CHANGED PER TDRR 07235 DR. [illegible] CHK [illegible] APPD. [illegible]	[illegible]	KCB



P2
P1
P3
1
2
3
1 142
2 141
3 140
1 142
2 141
3 140
TYPICAL WIRING FROM PIN 1 THRU PIN 142
ELECTRICAL SCHEMATIC



2—②
①
③
A
A
SEE NOTE 9
CAUTION - INSTALL WITH P3 UP
USE WITH MODULES B10 - B11, B30, B32 B33 REF WHITE PIN NO'S
B7, B8, B10-B11 REF YELLOW PIN NO'S
.25 TYP
.75
.88
P3
SEE NOTE 7
SEE NOTE 10
POTTING TO BE WITHIN .006 OF THESE SURFACES
142—⑤
142—④
⑧
P1 REF (SCHEMATIC)
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10
.20 2 PLACES
P2 REF (SCHEMATIC)
142—⑥
142—⑦
SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 142

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10-9-63

NOTES:

1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06–.09 LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.
9. MARK .19 HIGH WHITE CHARACTERS PER ND1002019
10. MARK .12 HIGH YELLOW CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	~~9~~
A/R	MIL-W-16878/4, TYPE E 22 AWG	WIRE, ELECTRICAL	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023-2	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020029	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.L. Taylor DATE 23 July 63
CHECKED [illegible] 12 Sept 63
APPROVAL A. Morse JPK 4 OCT 63
APPROVAL [illegible] 4 OCT 63
APPROVAL [illegible] 10/4/63
NASA APPROVAL [illegible] 10/11/63
MIT APPROVAL [illegible] 10/4/63
MIT APPROVAL [illegible] 1 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 3

CODE IDENT NO. ——— SIZE F NASA DRAWING NO. 1020035
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

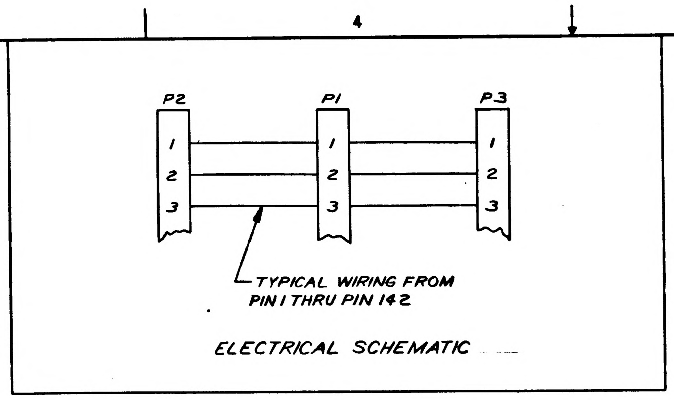
1020035

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

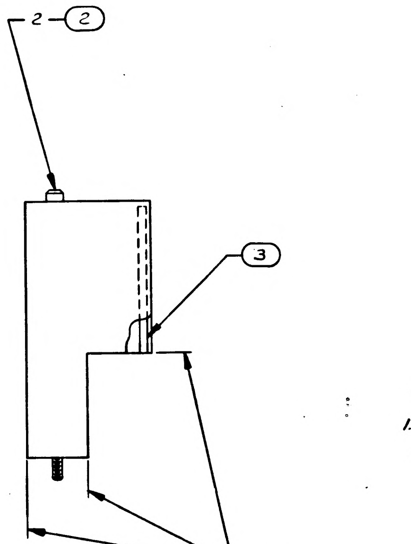
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

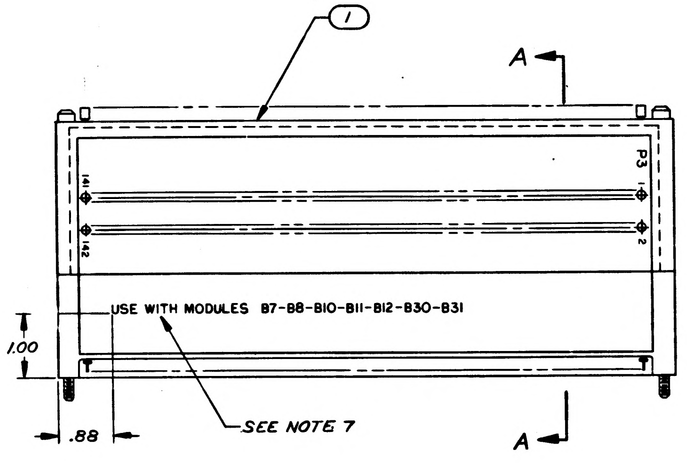
REVISIONS

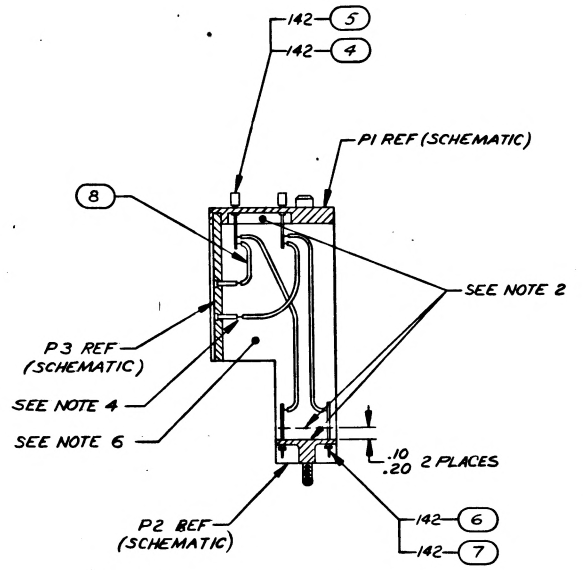
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17 Oct 63	


P2
P1
P3
1
2
3
1
2
3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 142

ELECTRICAL SCHEMATIC


2
2
3
POTTING TO BE WITHIN .005 OF THESE SURFACES


1
A
A
P3
141
142
1
2
USE WITH MODULES B7-B8-B10-B11-B12-B30-B31
1.00
.88
SEE NOTE 7


142
5
142
4
P1 REF (SCHEMATIC)
8
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10
.20
2 PLACES
P2 REF (SCHEMATIC)
142
6
142
7

SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 142

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:
1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH
5. SOLDER PER MIL-S-6872
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183 COLOR BLACK.
7. MARK .12 HIGH BLACK CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I.	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020029	FRAME, STICK EXTENDER	1

APPLICATION

NEXT ASSY	USED ON
1014465	1020002

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 23 July 63
CHECKED 12 Sept 63
APPROVAL 4 Oct 63
APPROVAL 4 Oct 63
APPROVAL 10/4/63
NASA APPROVAL 10/11/63
MIT APPROVAL 10/16/63
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

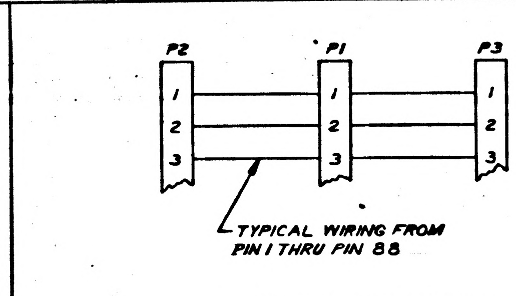
STICK EXTENDER ASSY
NO. 3

CODE IDENT NO —
SIZE F
NASA DRAWING NO 1020035
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

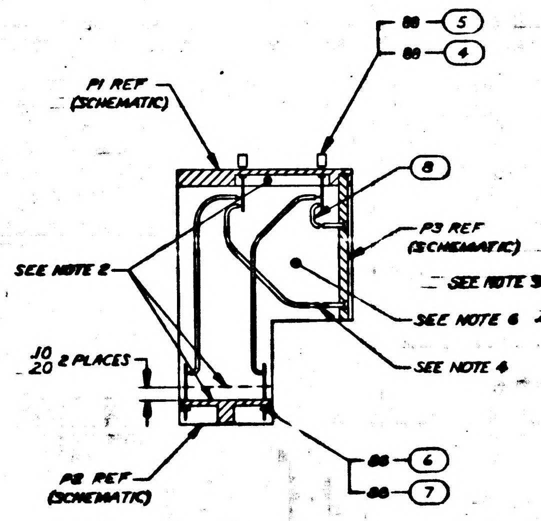
INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	[illegible]	[illegible]
A	CHANGED PER TDRR 07232 DR J.P. [illegible] CHK G. [illegible] APPD [illegible]	[illegible]	KED



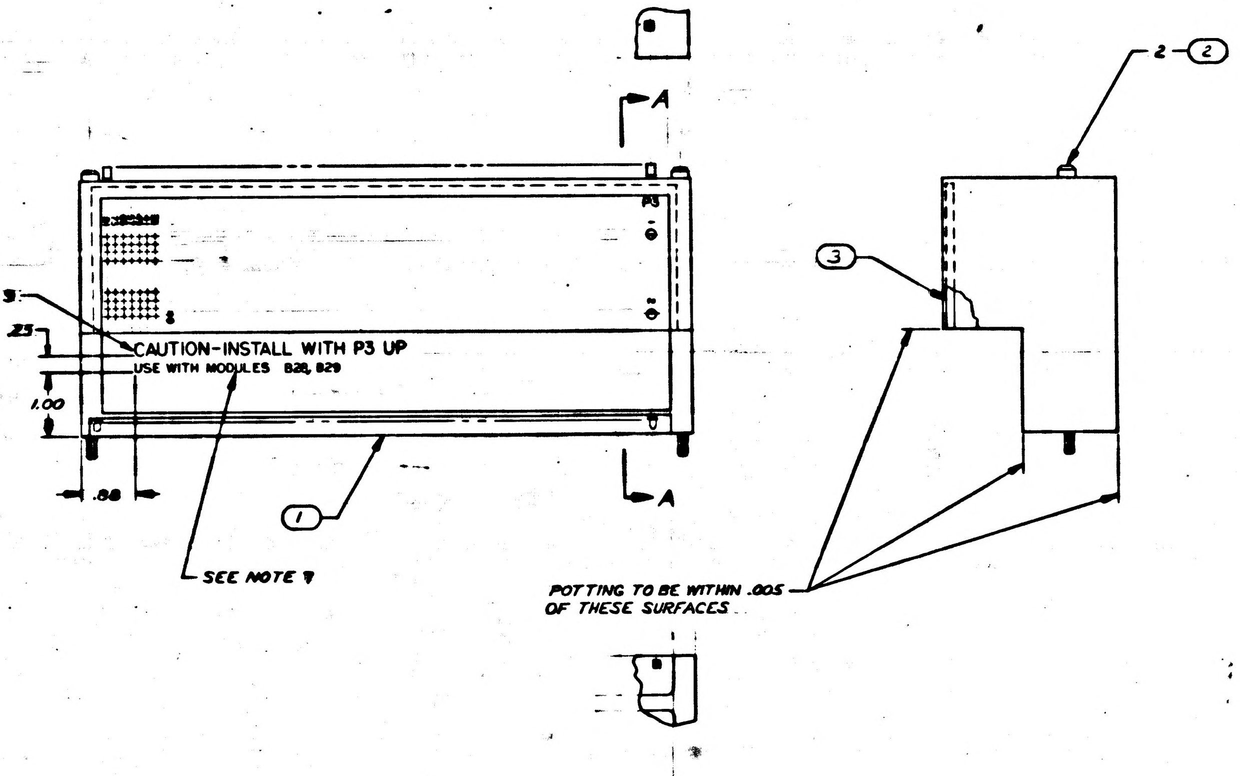
P2
P1
P3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 88

ELECTRICAL SCHEMATIC



88 ⑤
88 ④
P1 REF (SCHEMATIC)
⑧
P3 REF (SCHEMATIC)
SEE NOTE 2
SEE NOTE 6
SEE NOTE 4
.10
.20 2 PLACES
P2 REF (SCHEMATIC)
88 ⑥
88 ⑦

SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 88



A
A
P3
SEE NOTE 5
.25
CAUTION-INSTALL WITH P3 UP
USE WITH MODULES B28, B29
1.00
.88
①
SEE NOTE 7
2 ②
③
POTTING TO BE WITHIN .005 OF THESE SURFACES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 4/17/6[illegible]

NOTES:
1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.
9. MARK .19 HIGH CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
88	1006775	INSULATOR, WRAPOST-MALE, MIN	7
88	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
88	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
88	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020025	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020030	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1011465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 12 AUG 6[illegible]
CHECKED [illegible] 6 SEPT 68
APPROVAL [illegible] 9 OCT 68
APPROVAL [illegible] 4 OCT [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 4

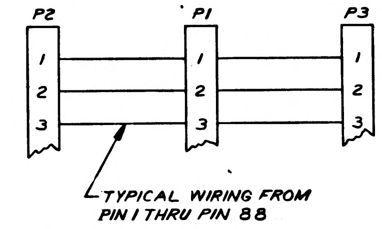
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020036
SCALE 1/1
WT
SHEET 1 OF 1

1020036

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

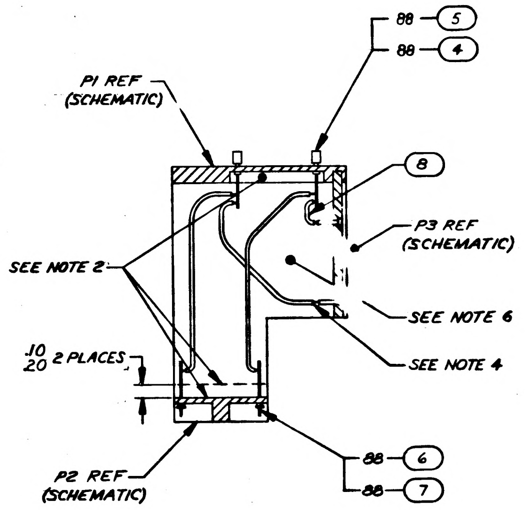
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17 Oct 63	

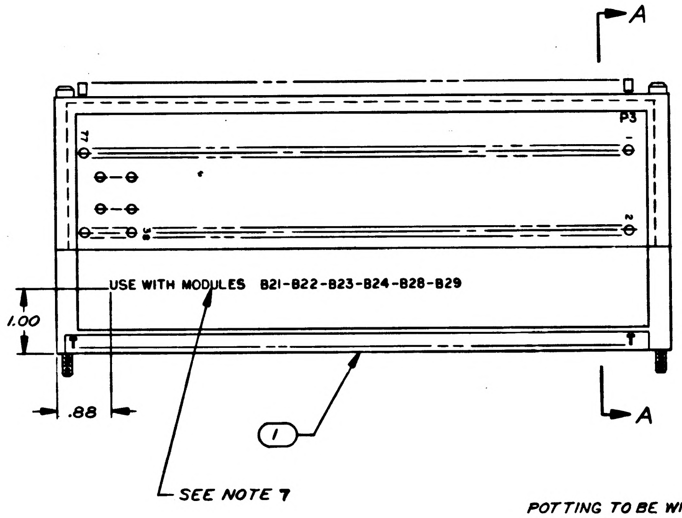


TYPICAL WIRING FROM PIN 1 THRU PIN 88

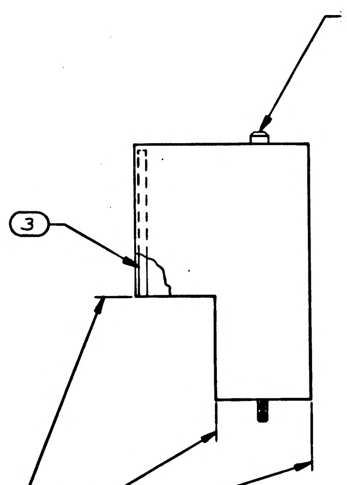
ELECTRICAL SCHEMATIC



SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 82



USE WITH MODULES B21-B22-B23-B24-B28-B29



POTTING TO BE WITHIN .005 OF THESE SURFACES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:

1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183 COLOR BLACK.
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
88	1006775	INSULATOR, WRAPOST-MALE, MIN	7
88	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
88	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
88	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020025	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT RELIEVED BODY	2
1	1020030	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.C. Taylor DATE 12 AUG 63
CHECKED 16 SEPT 63
APPROVAL 4 OCT 63
APPROVAL 4 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 10/16/63
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 4

CODE IDENT NO —— SIZE F NASA DRAWING NO 1020036
SCALE 1/1 WT SHEET 1 OF 1

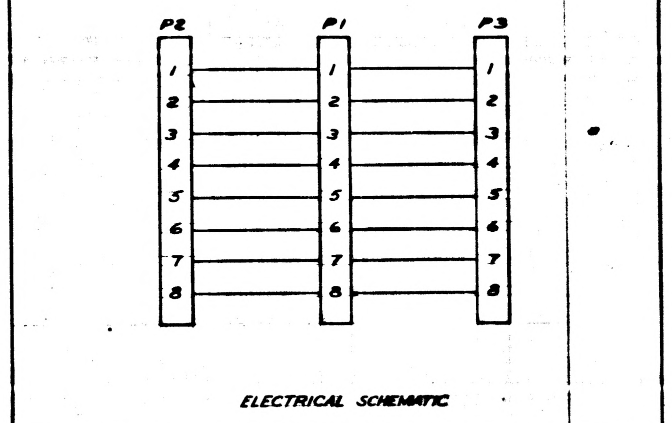
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

1020036

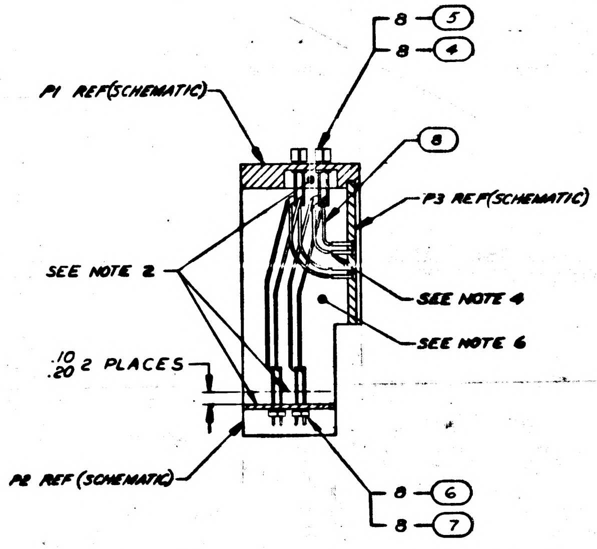
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17 Oct 63	
A	CHANGED PER TDRR 07236 DR. Brown CHK. APPD.	19 MAR 64	KEB



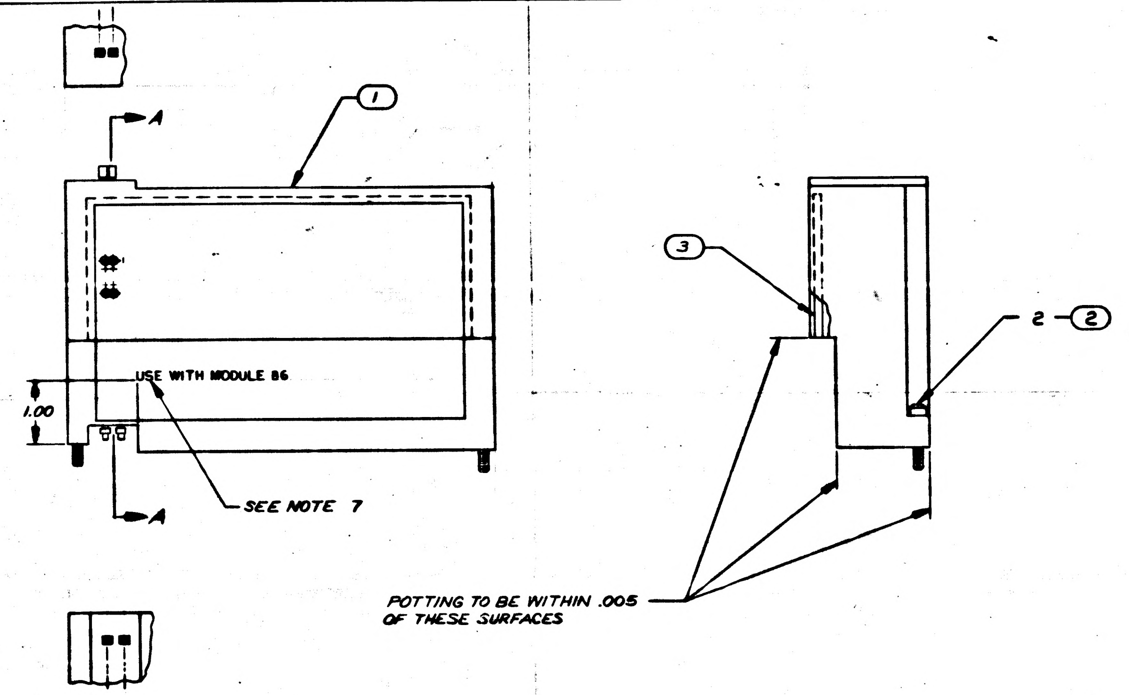
P2
P1
P3
1
2
3
4
5
6
7
8

ELECTRICAL SCHEMATIC



P1 REF(SCHEMATIC)
8 ⑤
8 ④
⑧
P3 REF(SCHEMATIC)
SEE NOTE 2
SEE NOTE 4
SEE NOTE 6
.10
.20 2 PLACES
P2 REF (SCHEMATIC)
8 ⑥
8 ⑦

SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 8



①
A
A
USE WITH MODULE 86
1.00
SEE NOTE 7
③
2 ②
POTTING TO BE WITHIN .005
OF THESE SURFACES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:
1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872.
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	~~9~~
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
8	1006775	INSULATOR, WRAPOST-MALE, MIN	7
8	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
8	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
8	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020026	TERMINAL BOARD, TEST POINT	3
2	1020022-2	SCREW, EXT RELIEVED BODY	2
1	1020031	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R C Taylor DATE 6 AUG 63
CHECKED 12 SEPT. 63
APPROVAL R. Morse 4 Oct 63
APPROVAL 4 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 5

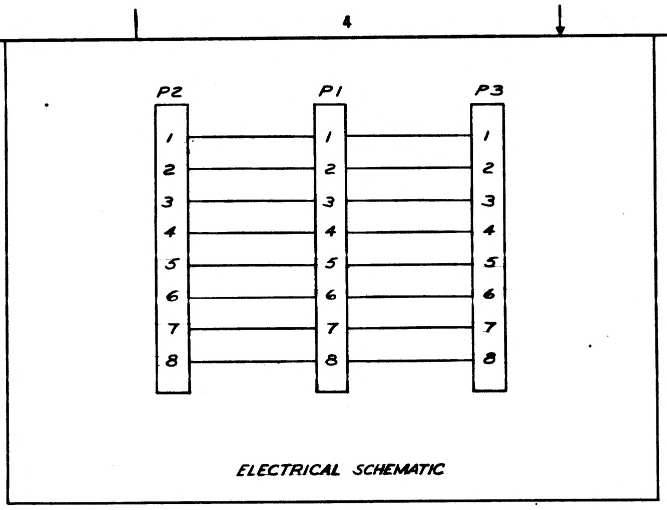
CODE IDENT NO. —— SIZE F NASA DRAWING NO. 1020037
SCALE 1/1 WT SHEET 1 OF 1

1020037

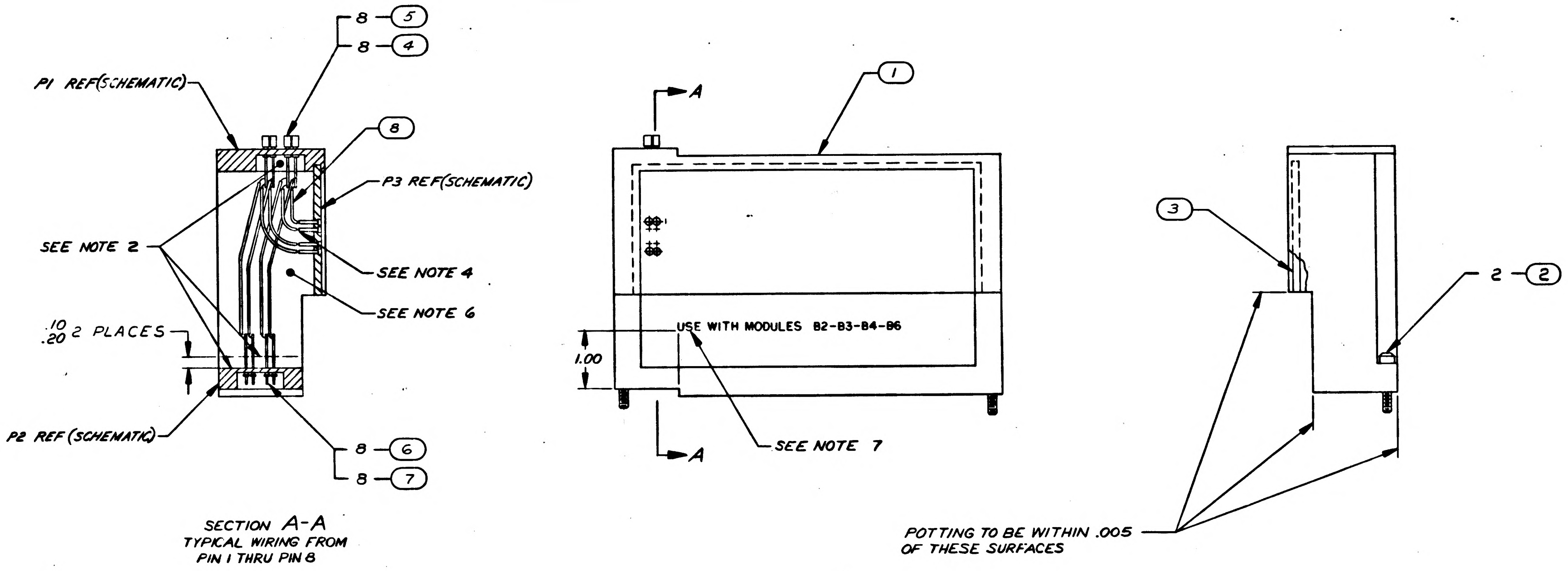
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	wik



ELECTRICAL SCHEMATIC



SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 8

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:

1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872.
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183. COLOR BLACK
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
8	1006775	INSULATOR, WRAPOST-MALE, MIN	7
8	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
8	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
8	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020026	TERMINAL BOARD, TEST POINT	3
2	1020022-2	SCREW, EXT RELIEVED BODY	2
1	1020031	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Tyndae DATE 6 AUG 63
CHECKED [illegible] 13 SEPT. 63
APPROVAL H. Morse QPR 4 OCT 63
APPROVAL [illegible] 4 Oct 63
APPROVAL [illegible] 10/4/63
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 10/4/63
MIT APPROVAL [illegible] 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 5

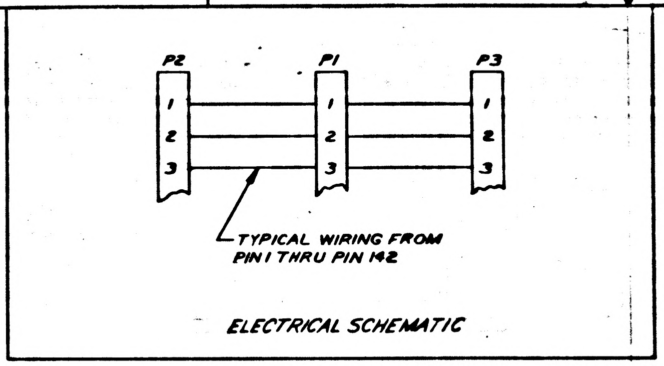
CODE IDENT NO — SIZE F NASA DRAWING NO 1020037
SCALE 1/1 WT SHEET 1 OF 1

1020037

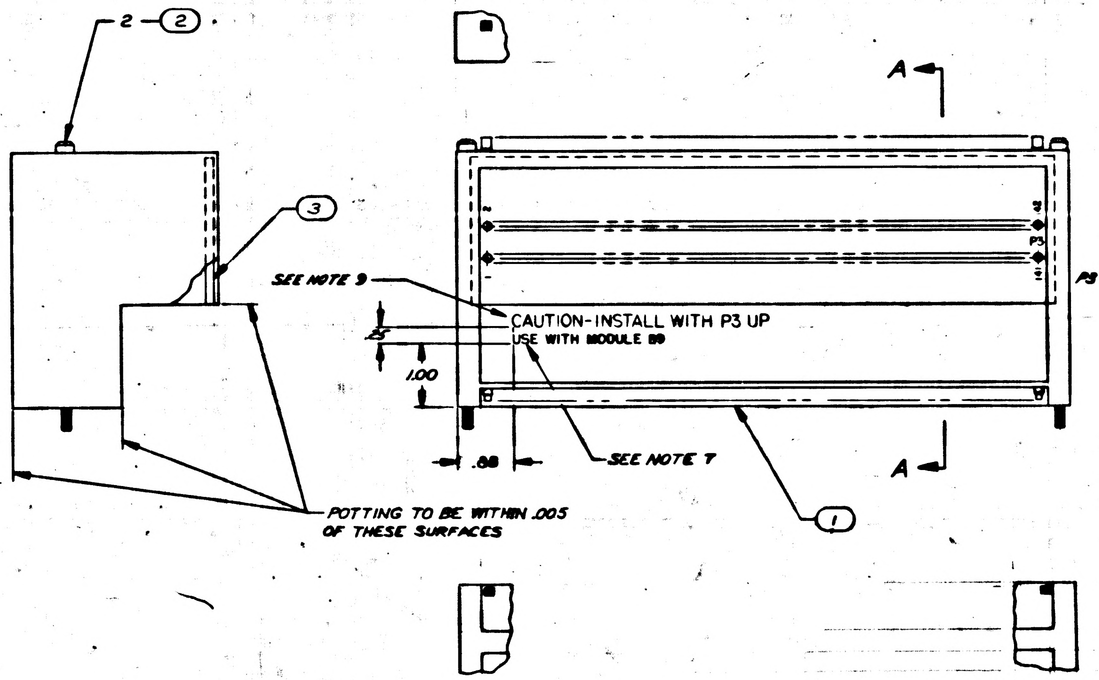
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

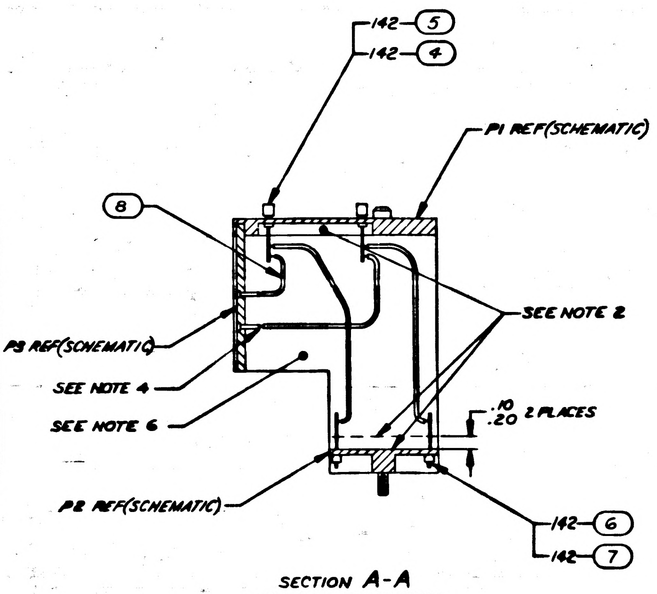
INCHES
0 1
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	10-63	
A	CHANGED PER TDRR 07293 DR. CHK APPD	64	


P2
P1
P3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 142

ELECTRICAL SCHEMATIC


2
2
3
1
SEE NOTE 9
CAUTION-INSTALL WITH P3 UP
USE WITH MODULE 89
.25
1.00
.88
SEE NOTE 7
A
A
P3
POTTING TO BE WITHIN .005 OF THESE SURFACES


142
5
142
4
P1 REF(SCHEMATIC)
8
SEE NOTE 2
P3 REF(SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10
.20
2 PLACES
P2 REF(SCHEMATIC)
142
6
142
7

SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 142

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63

NOTES:
1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872.
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. MARK .19 HIGH WHITE CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	~~9~~
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023-3	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT. RELIEVED BODY	2
1	1020032	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	NR0002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

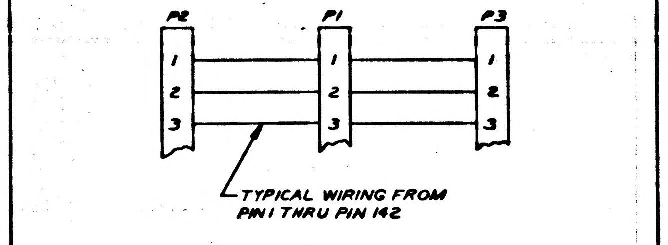
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-[illegible]
DRAWN PC Taylor DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible] OCT 63
APPROVAL [illegible] 4 OCT 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 6

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020038
SCALE 1/1
WT
SHEET 1 OF 2

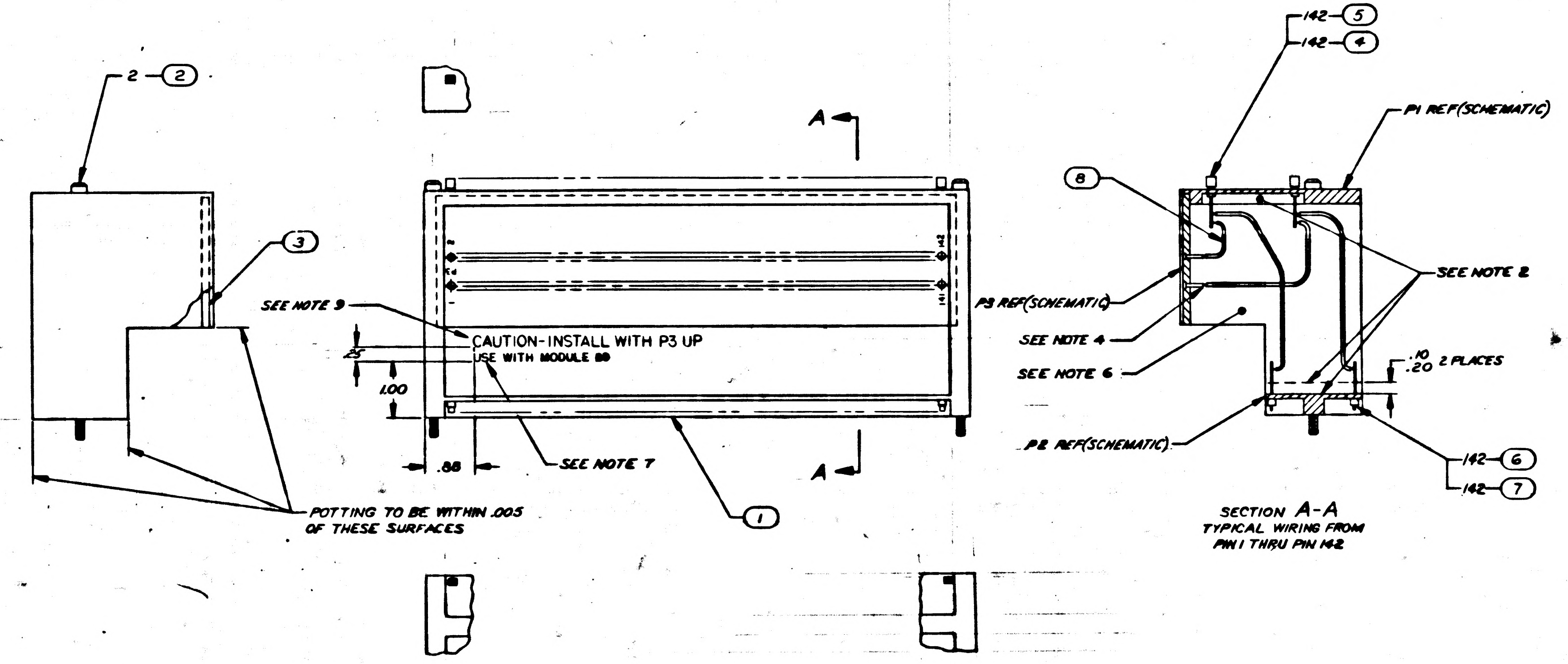
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	10/23	
A	CHANGED PER TDRR 07293 DR. [illegible] CHK [illegible] APPD [illegible]	10 APR. 64	
B	CHANGED PER TDRR 08128 DR. [illegible] CHK J.C. [illegible] APPD [illegible]	[illegible] 64	KCO



P2
P1
P3
1
2
3
TYPICAL WIRING FROM PIN 1 THRU PIN 142

ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63



2 – ②
③
SEE NOTE 9
CAUTION-INSTALL WITH P3 UP
USE WITH MODULE 89
.25
1.00
.88
SEE NOTE 7
①
A
A
POTTING TO BE WITHIN .005 OF THESE SURFACES
142 – ⑤
142 – ④
P1 REF (SCHEMATIC)
⑧
SEE NOTE 2
P3 REF (SCHEMATIC)
SEE NOTE 4
SEE NOTE 6
.10 .20 2 PLACES
P2 REF (SCHEMATIC)
142 – ⑥
142 – ⑦

SECTION A-A
TYPICAL WIRING FROM PIN 1 THRU PIN 142

NOTES:

1. BOND FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06-.09 LENGTH.
5. SOLDER PER MIL-S-6872.
6. FILL CAVITY PER ND1002002 (BLACK POLYURETHANE FOAM) INDICATED AREA ONLY
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. MARK .19 HIGH WHITE CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
~~A/R~~	~~1006904~~	~~EPOXY RESIN~~	~~9~~
A/R	ND1002131, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023-3	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT. RELIEVED BODY	2
1	1020032	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO
LEXINGTON, MASS.
CONTRACT NO NAS 9-[illegible]98
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible] 9 OCT 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 6

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020038
SCALE 1/1
WT
SHEET 1 OF 1

1020038

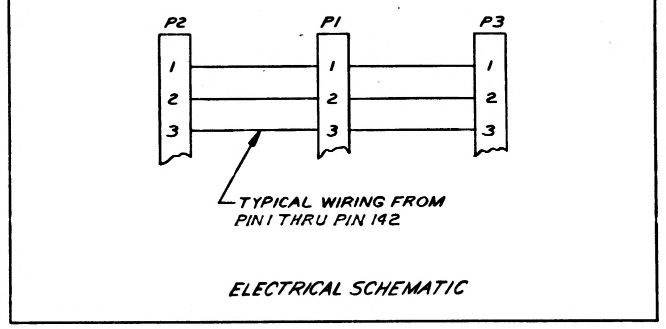
MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

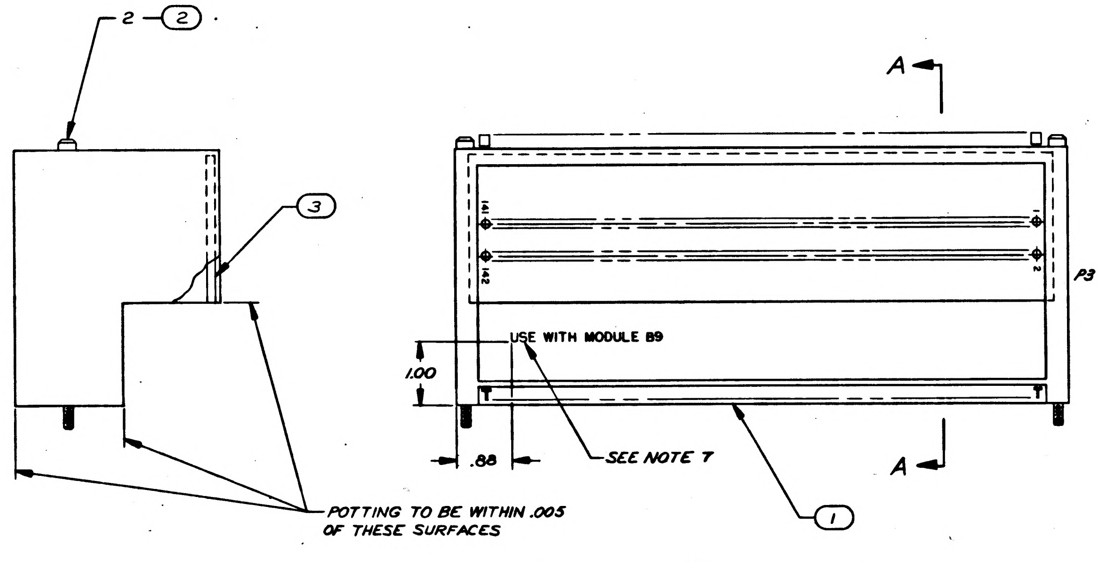
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

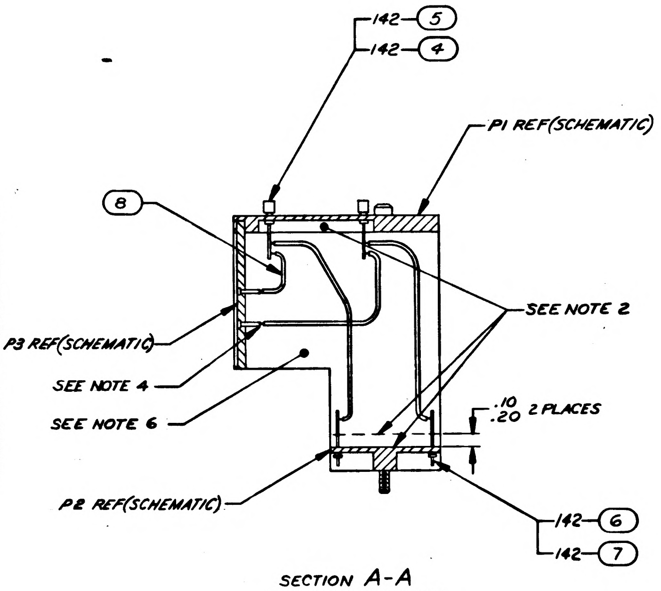
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03596	17Oct63	



ELECTRICAL SCHEMATIC





SECTION A-A
TYPICAL WIRING FROM
PIN 1 THRU PIN 142

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03596 DATE 10/17/63

NOTES:
1. STAKE FIND NO. 3 TO FIND NO. 1 PER ND1002004
2. APPLY FIND NO. 10 TO INDICATED AREAS
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. STRIP AND TIN FIND NO. 8 TO .06–.09 LENGTH.
5. SOLDER PER MIL-S-6872.
6. FILL CAVITY WITH FIND NO. 9 PER ND1002183 COLOR BLACK
7. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006834	COMPOUND, SILICONE RUBBER	10
A/R	1006904	EPOXY RESIN	9
A/R	ND1002181, TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	8
142	1006775	INSULATOR, WRAPOST-MALE, MIN	7
142	1006782-2	CONTACT, WRAPOST-MALE, MIN	6
142	1006774	INSULATOR, WRAPOST-FEMALE, MIN	5
142	1006781-3	CONTACT, WRAPOST-FEMALE, MIN	4
1	1020023	TERMINAL BOARD, TEST POINT	3
2	1020022-1	SCREW, EXT. RELIEVED BODY	2
1	1020032	FRAME, STICK EXTENDER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P.C. Taylor DATE 10 Aug 63
CHECKED 12 Sept 63
APPROVAL H Moran 9 Oct 63
APPROVAL 4 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL L Johnson 10/17/63
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STICK EXTENDER ASSY
NO. 6

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020038
SCALE 1/1
WT
SHEET 1 OF 2

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

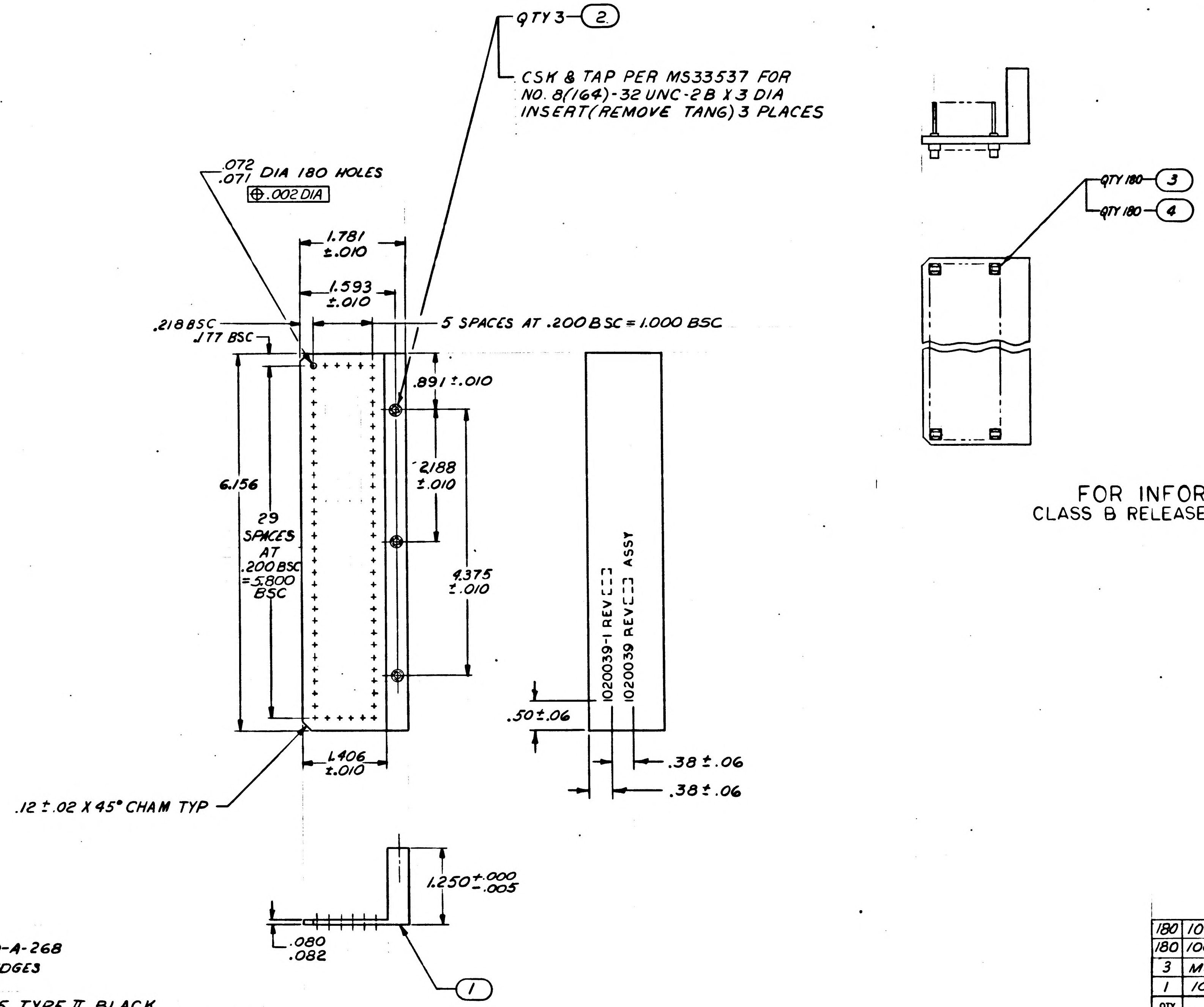
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
	CL B RELEASED PER TDRR 03586		


QTY 3 – ②
CSK & TAP PER MS33537 FOR NO. 8(164)-32 UNC-2B X 3 DIA INSERT (REMOVE TANG) 3 PLACES
.072 / .071 DIA 180 HOLES
⊕ .002 DIA
1.781 ±.010
1.593 ±.010
.218 BSC
.177 BSC
5 SPACES AT .200 BSC = 1.000 BSC
.891 ±.010
2.188 ±.010
4.375 ±.010
6.156
29 SPACES AT .200 BSC = 5.800 BSC
1.406 ±.010
.12 ± .02 X 45° CHAM TYP
.50 ±.06
1020039-1 REV [ ]
1020039 REV [ ] ASSY
.38 ±.06
.38 ±.06
1.250 +.000 / −.005
.080 / .082
①
QTY 180 – ③
QTY 180 – ④

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 03586 DATE 10/3/63

NOTES
1. MATL AL 2024-T4 PER QQ-A-268
2. REMOVE BURRS & SHARP EDGES
3. 125/ SURFACE QUALITY
4. ANODIZE PER MIL-A-8625, TYPE II, BLACK
5. MARK .12 HIGH WHITE CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
180	1006775	INSULATOR, CONTACT ELEC, MALE	4
180	1006782-2	CONTACT, ELEC, MALE, WRAPOST	3
3	MS122239	INSERT, HELICAL COIL	2
1	1020039-1	HEADER	1

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
1020	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 5 SEPT 63
CHECKED David Conlon 7 SEPT 63
APPROVAL H. Moss 20 SEPT 63
APPROVAL 9-20-63
APPROVAL 9/20/63
NASA APPROVAL 10-2-63
MIT APPROVAL 30 Oct 63
MIT APPROVAL 10/1/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020039
SCALE 1/1
WT
SHEET 1 OF 1

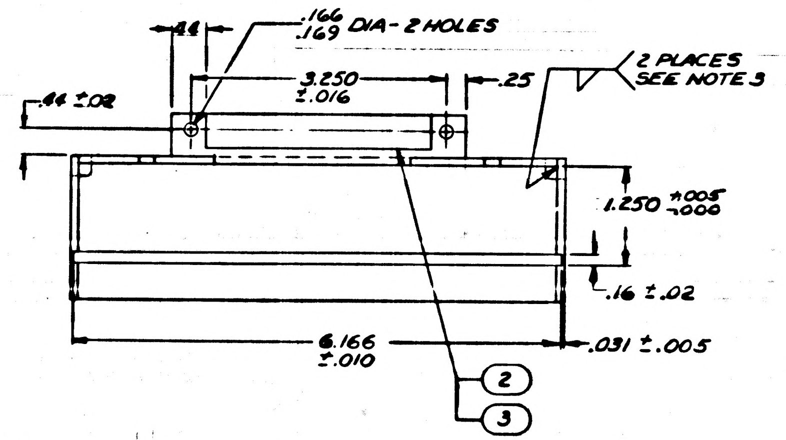
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

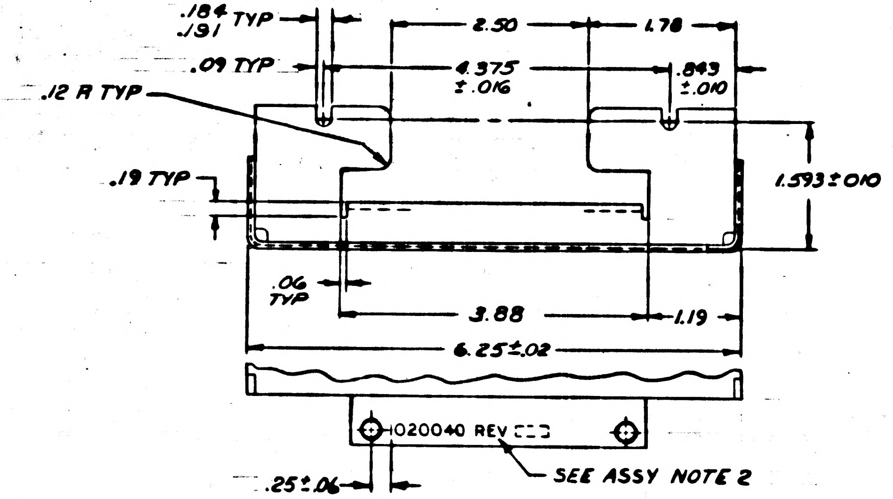
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO [illegible] CONSENT OF RAYTHEON CO.

REVISIONS

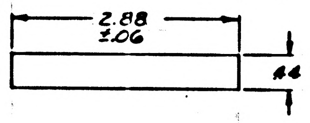
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO. 03586		
A	CHANGED PER TDRR NO 06675 DR YWP CHK J.C.J. APPD	9 MAR 64	KB



.44
.166
.169 DIA - 2 HOLES
3.250
±.016
.25
2 PLACES
SEE NOTE 3
.44 ±.02
1.250 +.005 −.000
.16 ±.02
6.166
±.010
.031 ±.005
2
3

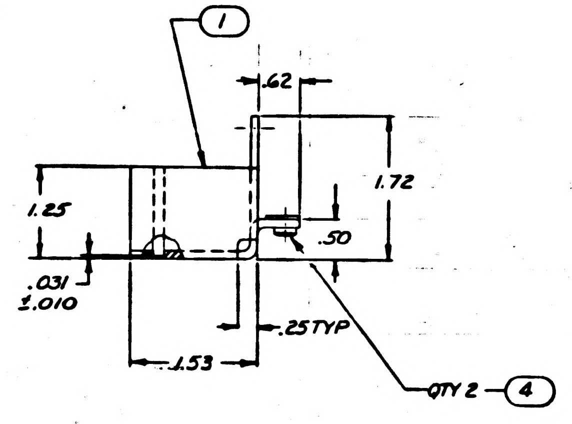


.184
.191 TYP
2.50
1.78
.09 TYP
4.375
±.016
.893
±.010
.12 R TYP
1.593 ±.010
.19 TYP
.06
TYP
3.88
1.19
6.25 ±.02
1020040 REV
SEE ASSY NOTE 2
.25 ±.06



NOTES:
1. MATL .03 THK RUBBER SOLID PER MIL-R-3065, CLASS SC, GRADE 415

PAD
1020040-2



1
.62
1.72
1.25
.50
.031
±.010
.25 TYP
1.53
QTY 2
4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 03586 DATE 10/3/63

①
NOTES
1. MATL: .090 THK 5052-H32 AL PER QQ-A-318
2. BREAK SHARP EDGES .005-.015
3. WELD PER MIL-W-8604
4. BEND RADII .06 +.03 -.01
5. ANODIZE FIND NO. 1 PER MIL-A-8625, TYPE II, BLACK

ASSY NOTES
1. ASSEMBLE FIND NO. 2 TO FIND NO. 1 USING FIND NO. 3
2. MARK .12 HIGH WHITE CHARACTERS PER ND 1002019

MASTER

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1006989-7	NUT, SELF CLINCHING	4
AR	MIL-A-5092 TYPE III	CEMENT	3
1	1020040-2	PAD	2
1	1020040-1	COVER	1

APPLICATION

NEXT ASSY	USED ON
1020054	1019465

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 5 SEPT 63
CHECKED 7 SEPT 63
APPROVAL 20 SEPT 63
APPROVAL 9-20-63
APPROVAL
NASA APPROVAL 10-2-63
MIT APPROVAL 3 Oct 63
MIT APPROVAL 10/1/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, CONNECTOR

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020040
SCALE 1/1
WT
SHEET 1 OF 1

1020040

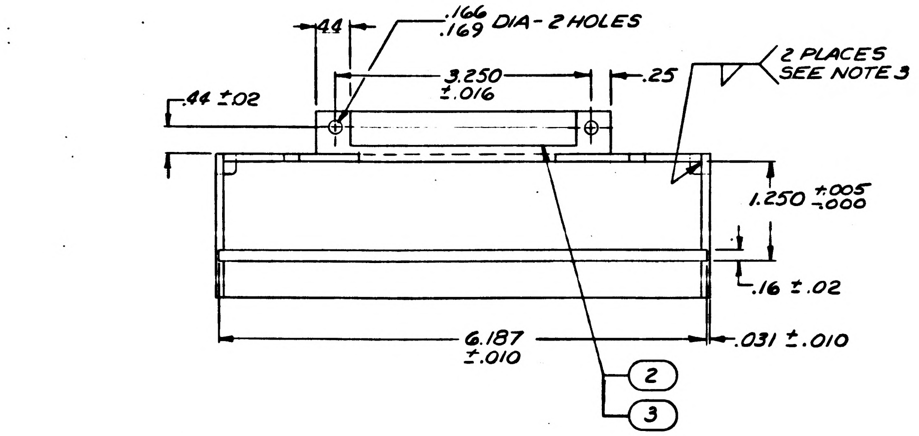
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

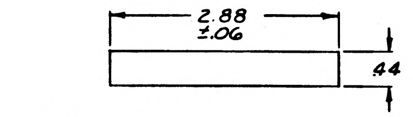
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

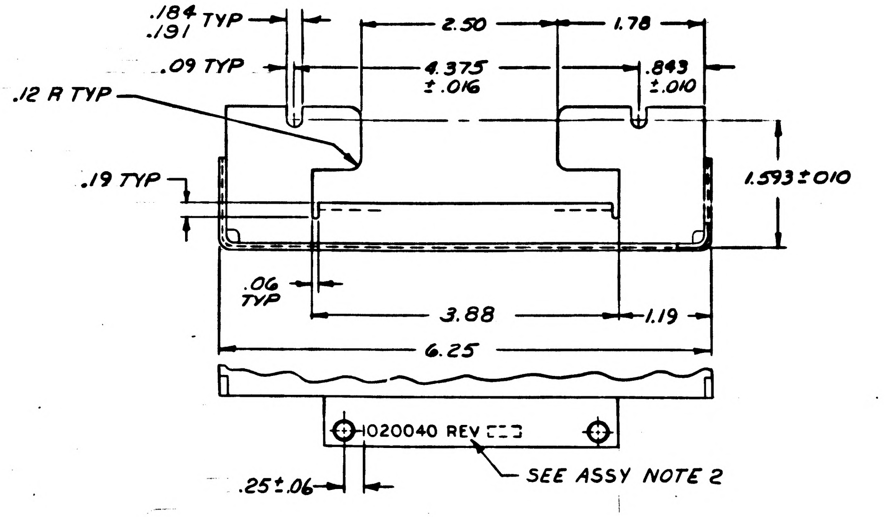
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO. 03586		

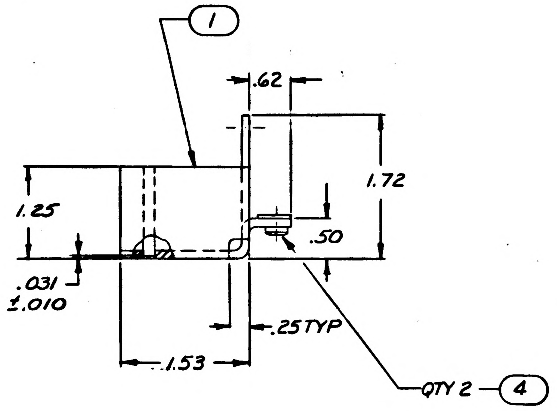

.44
.166 .169 DIA - 2 HOLES
3.250 ±.016
.25
2 PLACES SEE NOTE 3
.44 ±.02
1.250 +.005 -.000
.16 ±.02
6.187 ±.010
.031 ±.010
2
3



NOTES
1. MATL .03 THK RUBBER SOLID PER MIL-R-3065, CLASS SC, GRADE 415

PAD
1020040-2


.184 .191 TYP
2.50
1.78
.09 TYP
4.375 ±.016
.843 ±.010
.12 R TYP
.19 TYP
1.593±.010
.06 TYP
3.88
1.19
6.25
1020040 REV
SEE ASSY NOTE 2
.25±.06


1
.62
1.72
1.25
.50
.031 ±.010
.25 TYP
1.53
QTY 2
4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 03586 DATE 10/3/63

①
NOTES
1. MATL: .090 THK 5052-H32 AL PER QQ-A-318
2. BREAK SHARP EDGES .005-.015
3. WELD PER MIL-W-8604
4. BEND RADII .06 +.03 -.01
5. ANODIZE FIND NO. 1 PER MIL-A-8625, TYPE II, BLACK

ASSY NOTES
1. ASSEMBLE FIND NO. 2 TO FIND NO. 1 USING FIND NO. 3
2. MARK .12 HIGH WHITE CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1006989-7	NUT, SELF CLINCHING	4
AR	MIL-A-5092 TYPE III	CEMENT	3
1	1020040-2	PAD	2
1	1020040-1	COVER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 5 SEPT 63
CHECKED 7 SEPT 63
APPROVAL H. Morrell 20 SEPT 63
APPROVAL 9-20-63
APPROVAL 9/3/63
NASA APPROVAL 10-2-63
MIT APPROVAL 3 Oct 63
MIT APPROVAL 10/1/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, CONNECTOR

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020040
SCALE 1/1
WT
SHEET 1 OF 1

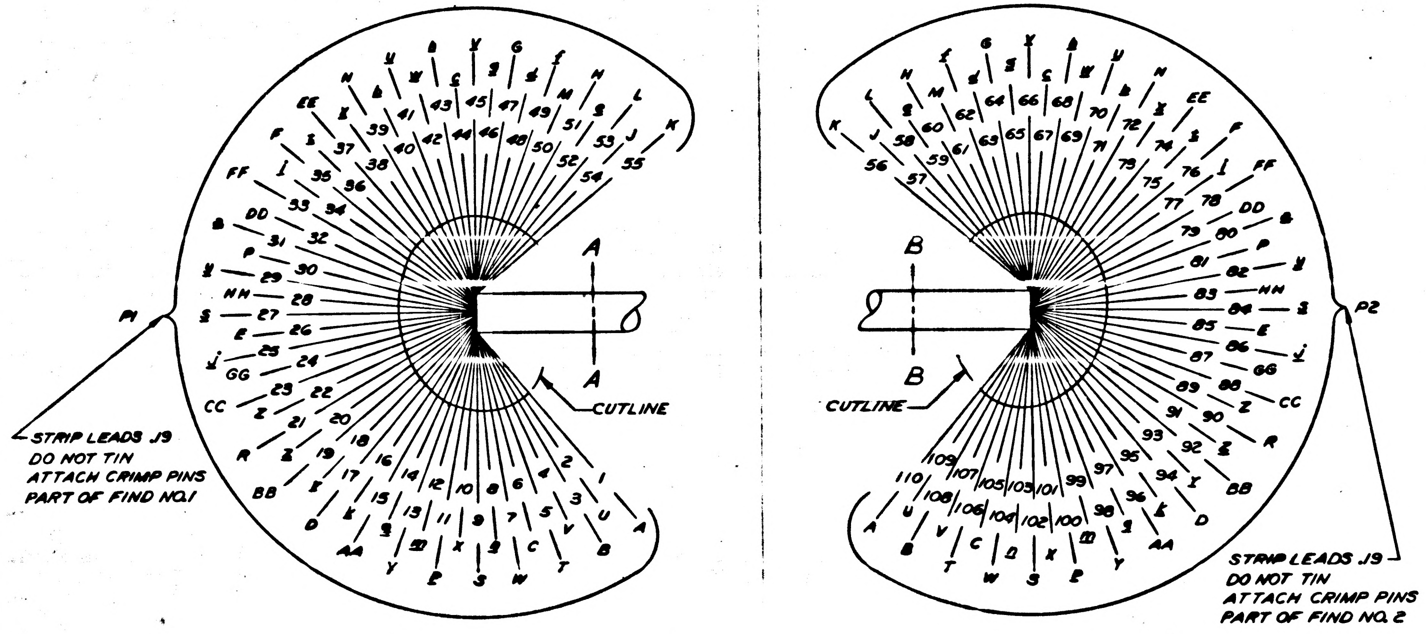
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

1050501

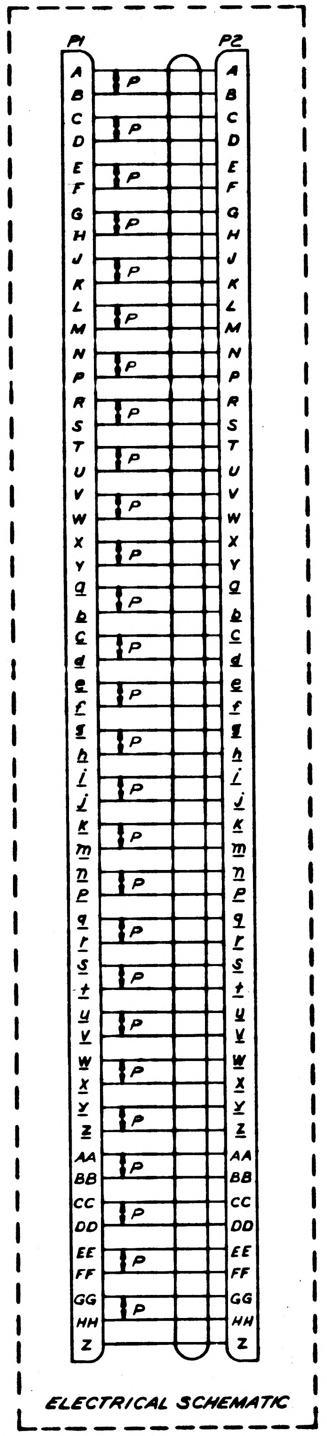
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07231 DR WP CH [illegible] APPD [illegible]	[illegible] 64	KEA

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	

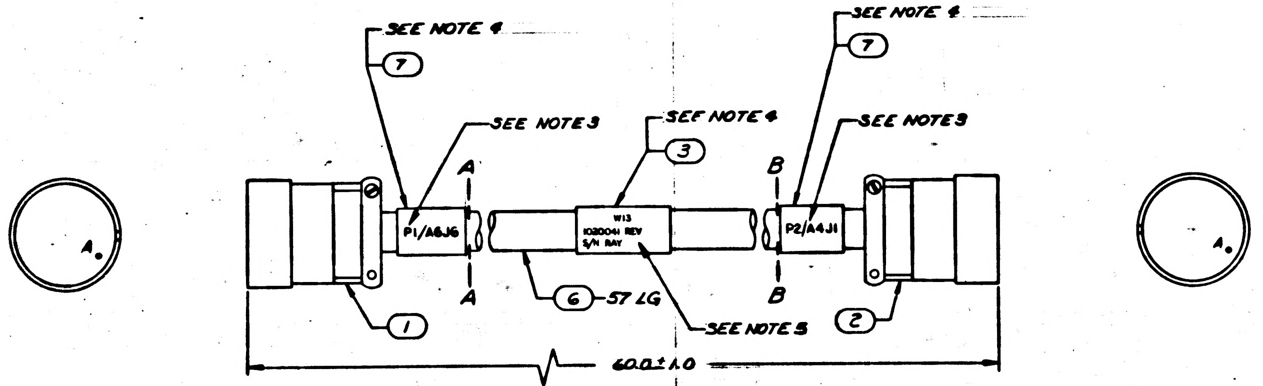


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1

STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2



ELECTRICAL SCHEMATIC



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE a CLASS I, CATEGORY I
FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND USING TETRAHYDOFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	MIL W 16878 TYPE E 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-22-55PY	CONNECTOR	2
1	MS3126F-22-55PW	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	R80002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
NASA APPROVAL [illegible]
NASA APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

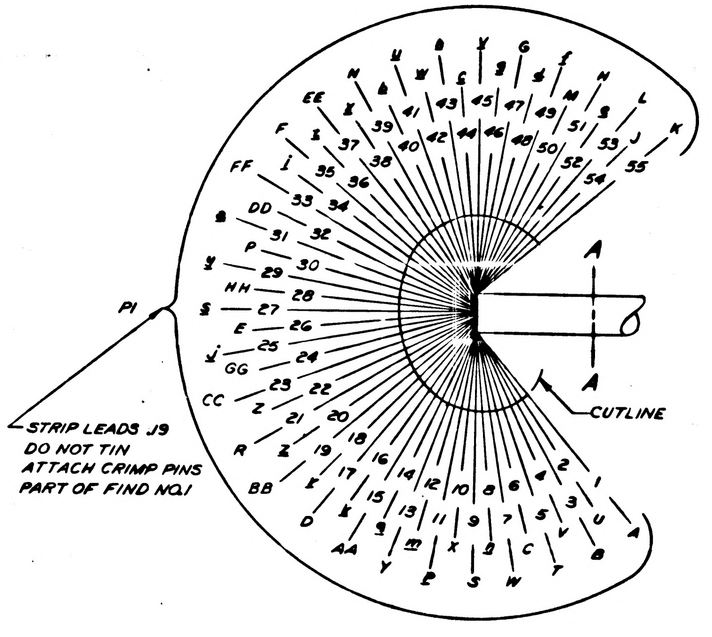
CABLE ASSEMBLY
W13
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020041
SCALE 1/1
WT
SHEET 1

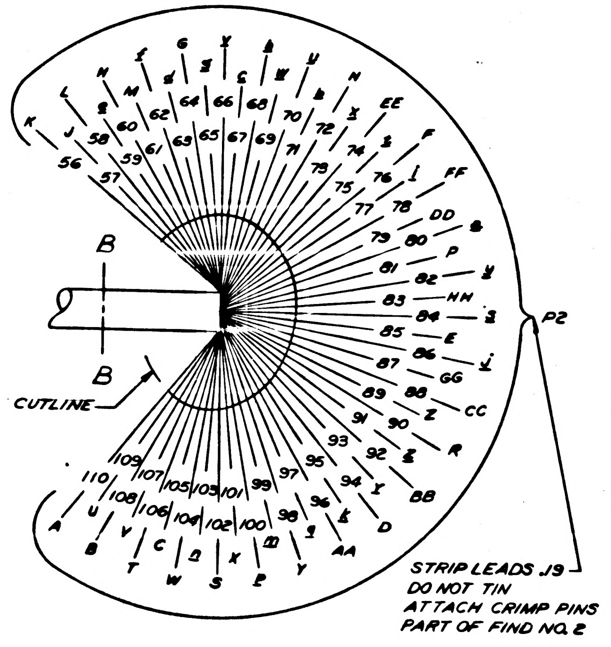
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07231 DR FWP CHK APPD	MAR 64	KCS
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	28 MAY 65	

ASSEMBLY INFORMATION CHART

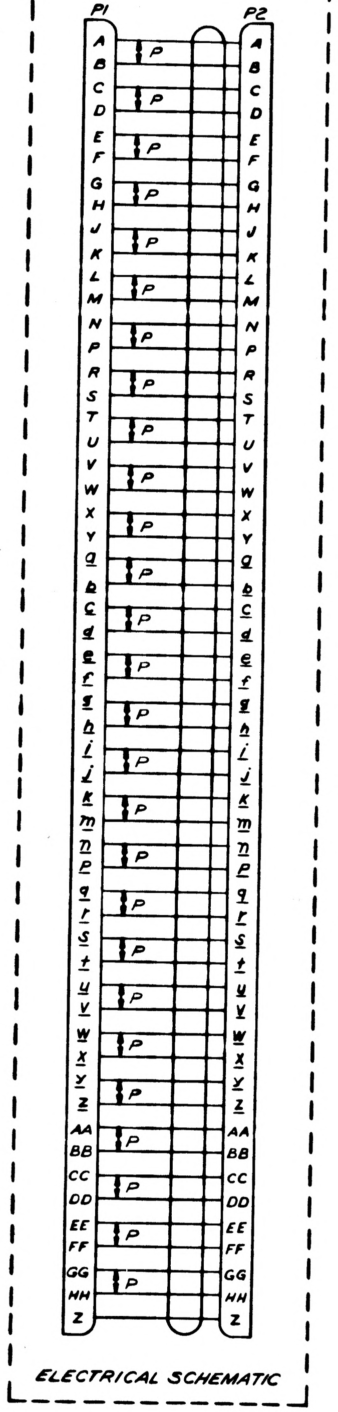
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	


P1
A
A
CUTLINE

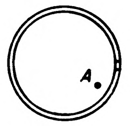
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1

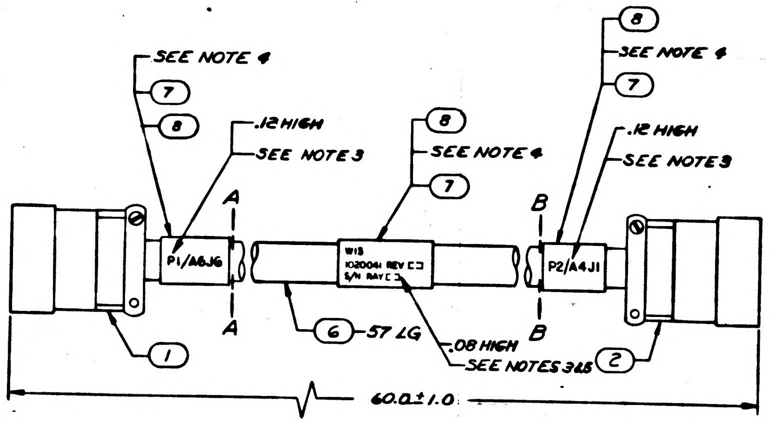

P2
B
B
CUTLINE

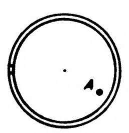
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2


P1
P2
A B C D E F G H J K L M N P R S T U V W X Y Z a b c d e f g h i j k m n p q r s t u v w x y z AA BB CC DD EE FF GG HH Z
P

ELECTRICAL SCHEMATIC




SEE NOTE 4
7
8
.12 HIGH
SEE NOTE 3
A
A
P1/A6J6
8
SEE NOTE 4
7
W13 1020041 REV C S/N RAY C
B
B
P2/A4J1
8
SEE NOTE 4
7
.12 HIGH
SEE NOTE 3
1
6
*57 LG
.08 HIGH
SEE NOTES 3&5
2
60.0±1.0



NOTES
1. FOR FABRICATION SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE a CLASS I, CATEGORY I
FOR FIND NO. 6 AWG 5/8 IN.
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

*DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	8
	3	1014472-4A	BAND MARKER, CABLE	7
*	5.0	SEE NOTE 2	SLEEVING	6
*	160	1014341-11	WIRE, ELECTRICAL	5
*	5.0	~~MIL-W-16878~~ TYPE E 22 BLK	WIRE, ELECTRICAL	4
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-22-55PY	CONNECTOR	2
	1	MS3126F-22-55PW	CONNECTOR	1

LIST OF MATERIALS

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 5SEP63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

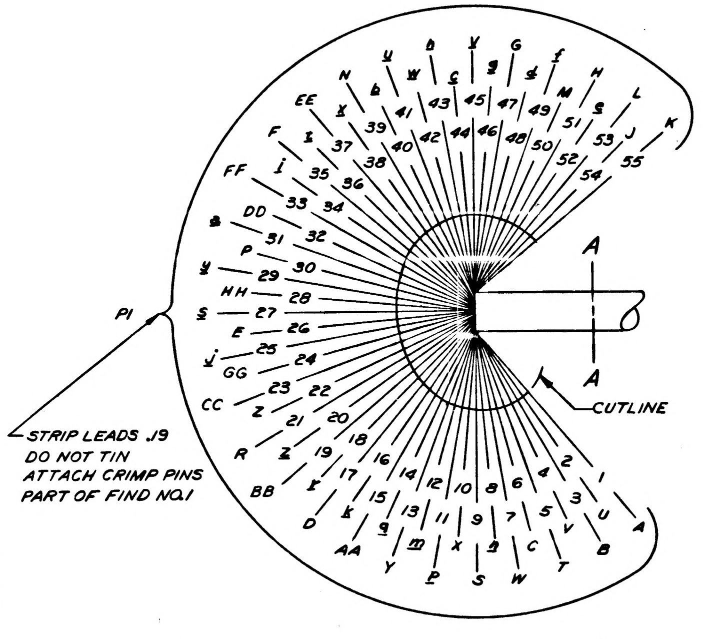
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

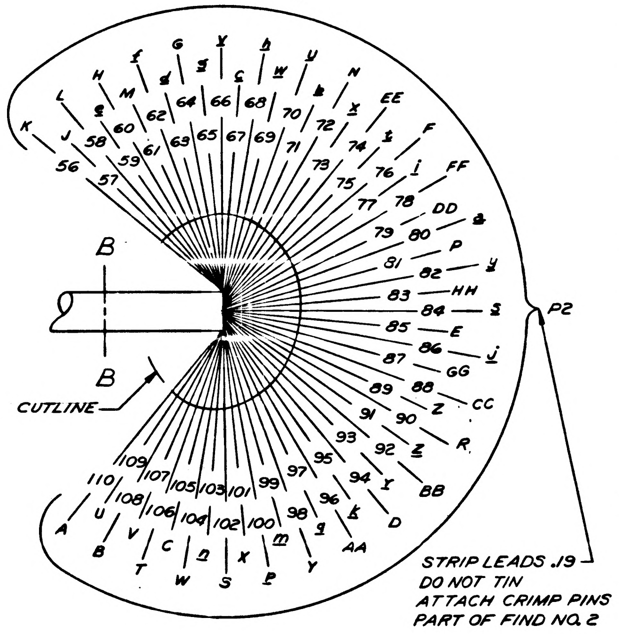
CABLE ASSEMBLY
W13
OPERATION CONSOLE

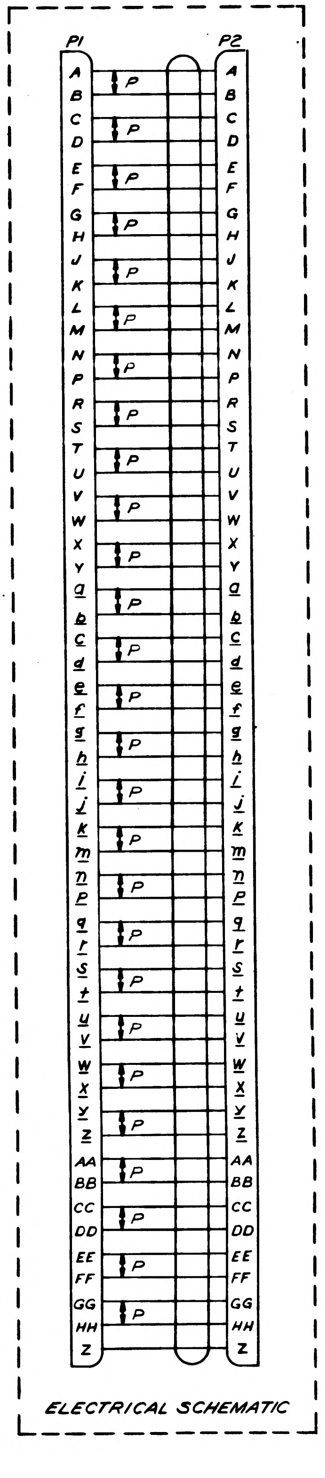
CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020041
SCALE 1/1
WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

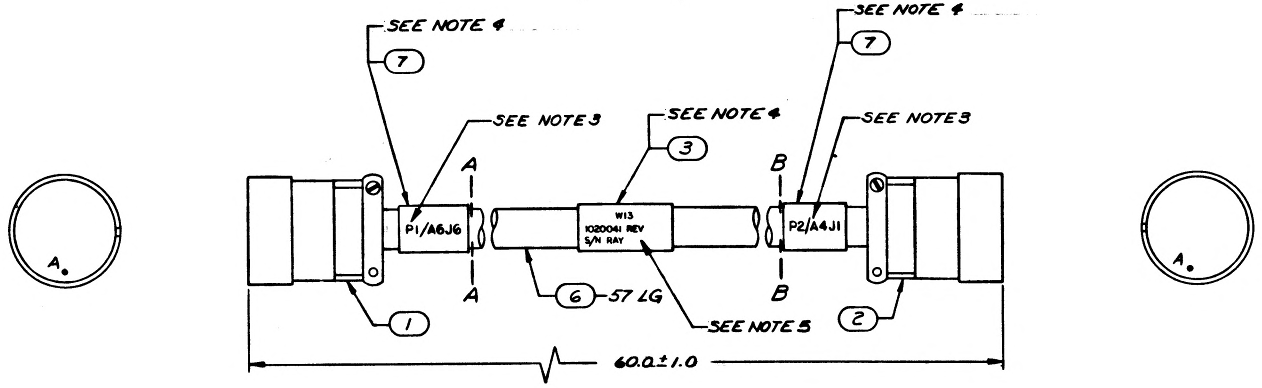
ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	110	
	3	WHT			108	
	6	BLK	22	5	105	
	17	WHT			94	
	26	BLK	22	5	85	
	35	WHT			76	
	47	BLK	22	5	64	
	51	WHT			60	
	54	BLK	22	5	57	
	55	WHT			56	
	53	BLK	22	5	58	
	50	WHT			61	
	39	BLK	22	5	72	
	30	WHT			81	
	21	BLK	22	5	90	
	9	WHT			102	
	5	BLK	22	5	106	
	2	WHT			109	
	4	BLK	22	5	107	
	7	WHT			104	
	10	BLK	22	5	101	
	13	WHT			98	
	31	BLK	22	5	80	
	40	WHT			71	
	44	BLK	22	5	67	
	48	WHT			63	
	52	BLK	22	5	59	
	49	WHT			62	
	46	BLK	22	5	65	
	43	WHT			68	
	34	BLK	22	5	77	
	25	WHT			86	
	16	BLK	22	5	95	
	12	WHT			99	
	8	BLK	22	5	103	
	11	WHT			100	
	14	BLK	22	5	97	
	18	WHT			93	
	27	BLK	22	5	84	
	36	WHT			75	
	41	BLK	22	5	70	
	45	WHT			66	
	42	BLK	22	5	69	
	38	WHT			73	
	29	BLK	22	5	82	
	20	WHT			91	
	15	BLK	22	5	96	
	19	WHT			92	
	23	BLK	22	5	88	
	32	WHT			79	
	37	BLK	22	5	74	
	33	WHT			78	
	24	BLK	22	5	87	
	28	WHT			83	
	22	BLK	22	4	89	


P1
A
A
CUTLINE
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1


P2
B
B
CUTLINE
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.2



ELECTRICAL SCHEMATIC


SEE NOTE 4
7
SEE NOTE 3
SEE NOTE 4
3
SEE NOTE 4
7
SEE NOTE 3
A
A
B
B
P1/A6J6
W13
1020041 REV
S/N RAY
P2/A4J1
1
6
57 LG
SEE NOTE 5
2
60.0±1.0
A.
A.

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U a GRADE a CLASS I, CATEGORY I
FOR FIND NO. 6 AWG $\frac{5}{8}$ IN.
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-3A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	1014341-11	WIRE, ELECTRICAL	5
AR	ND1002181 TYPE I, CL I	WIRE, ELEC, AWG 22, BLK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-22-55PY	CONNECTOR	2
1	MS3126F-22-55PW	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN Ed [illegible] DATE 5 SEP 63
CHECKED G. Cozzens 9 Oct 63
APPROVAL N. Morse JPK 28 OCT 63
APPROVAL [illegible] 28 OCT 63
APPROVAL [illegible]
NASA APPROVAL W J [illegible] 11-5-63
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W13
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO 1020041
SCALE 1/1 WT SHEET 1 OF 1

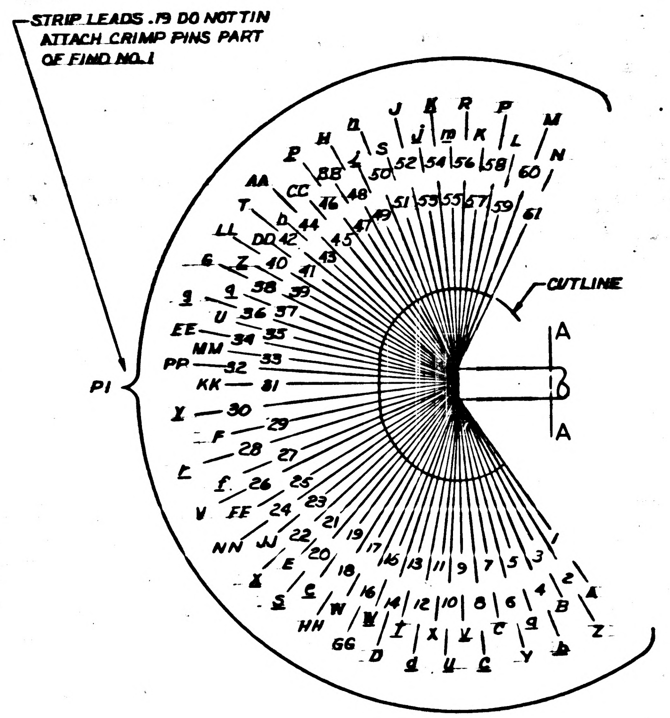
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

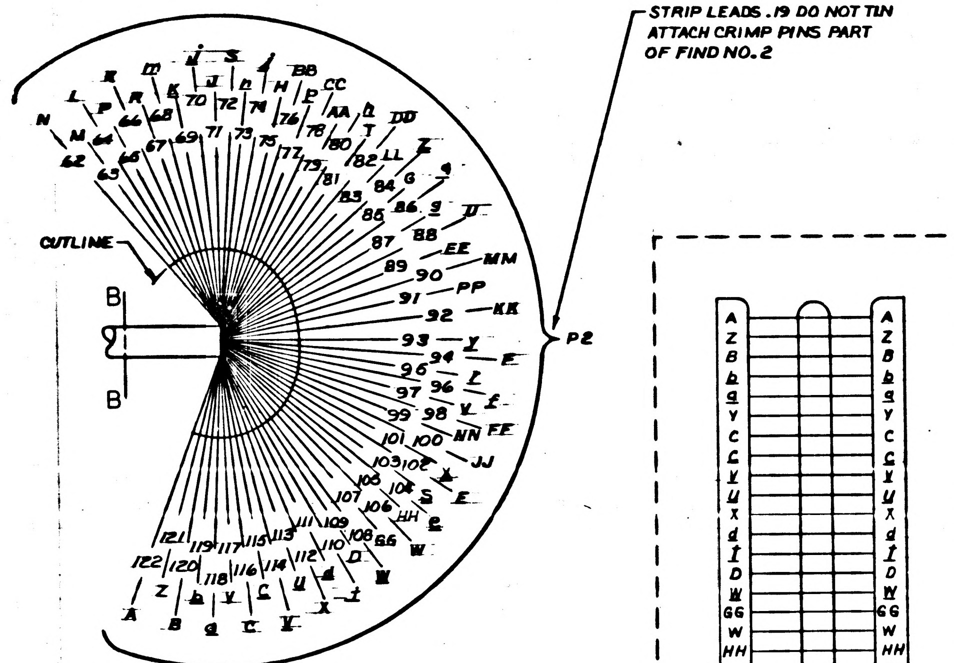
1020041

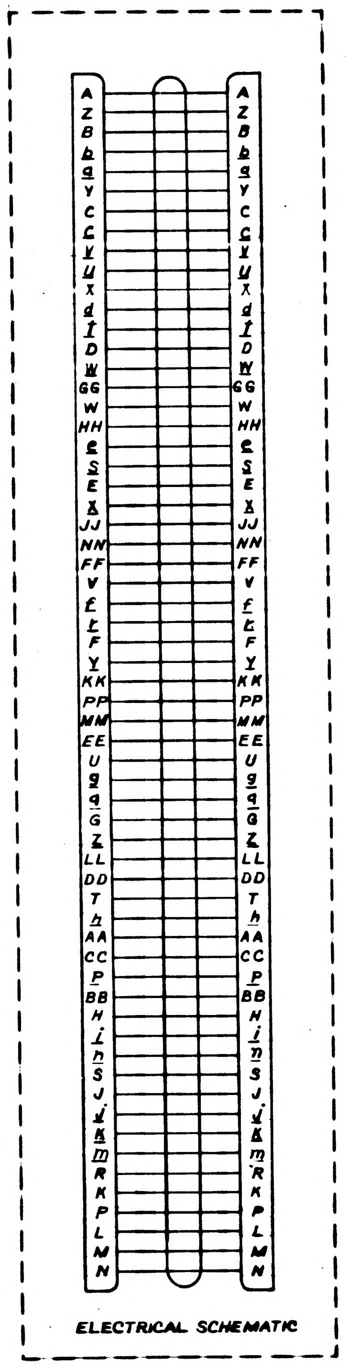
SP00501

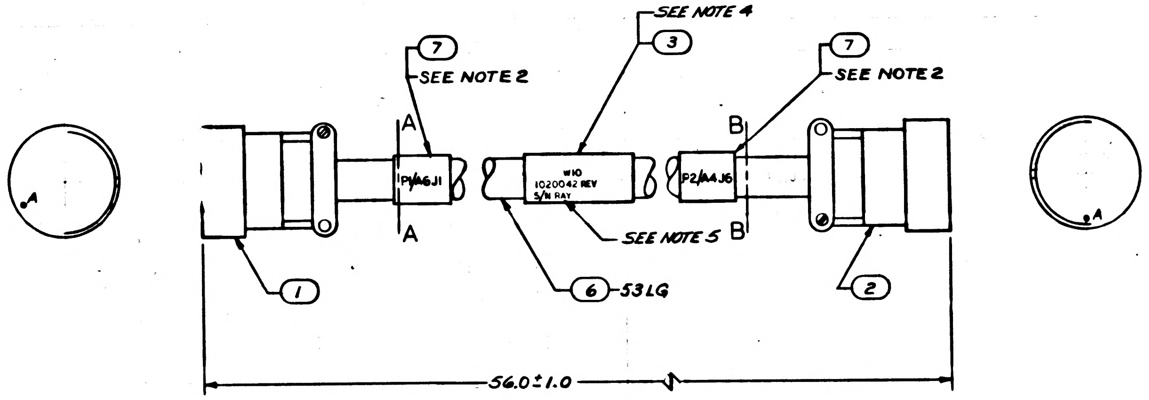
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	~~CLASS B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 06897 DR. K. Bull CHK. APPD.	13 MAR 64	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLACK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLACK	22	4	117	
	7	WHITE	22	5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHITE	22	5	62	


STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 1


STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 2


ELECTRICAL SCHEMATIC



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0413 DATE 28 OCT 63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, FOR FIND NO. 6 AWG 5/8 IN.
4. BOND FIND NO. 3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE.
5. MARK .08 HIGH BLACK PER ND1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 3	SLEEVING	6
AR	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELEC	5
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELEC	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61PY	CONNECTOR	2
1	MS3126F-24-61SX	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN DATE 27 SEP 63
CHECKED 3 Oct 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W10
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020042
SCALE 1/1 WT SHEET 1 OF 1

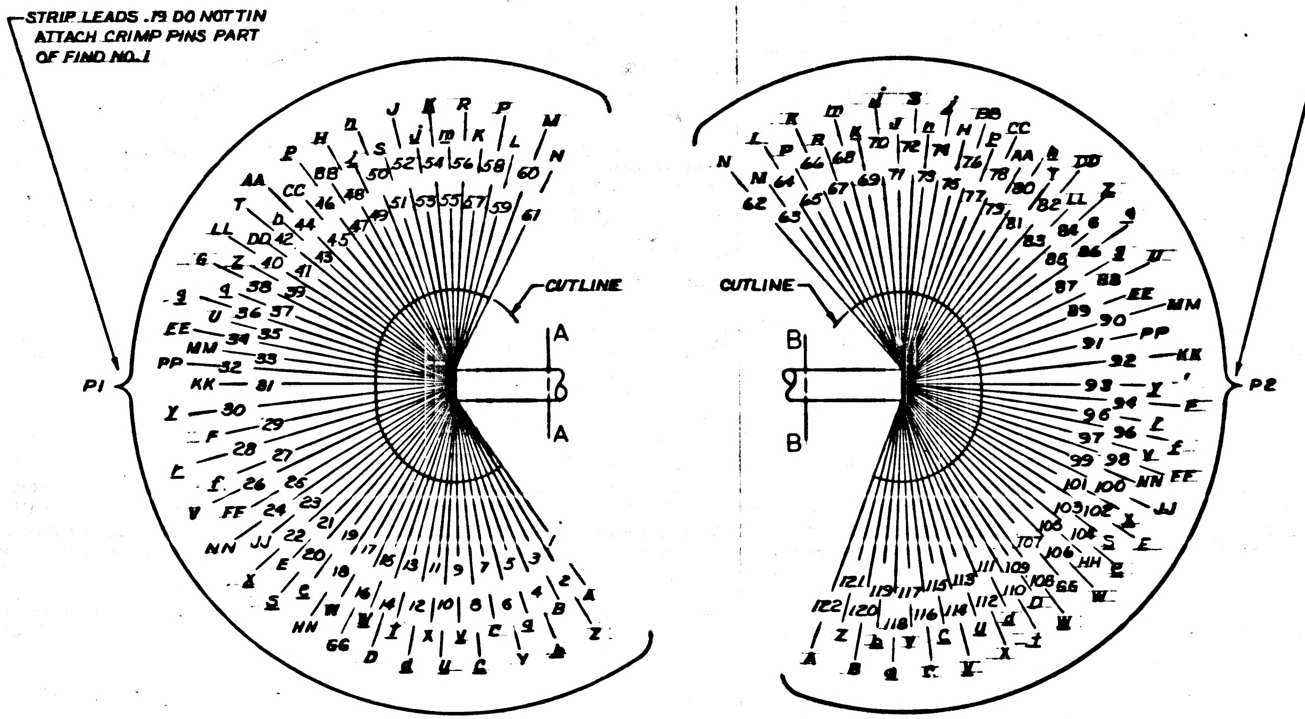
1020042

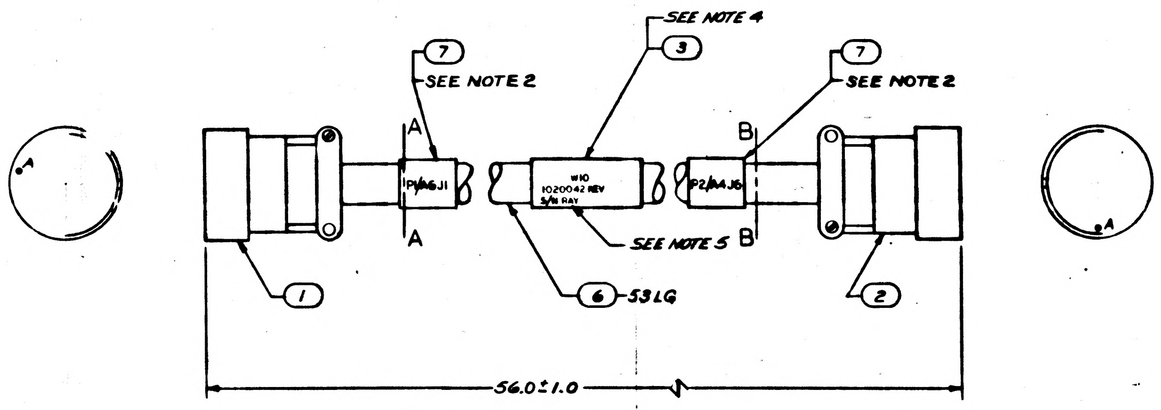
1020042

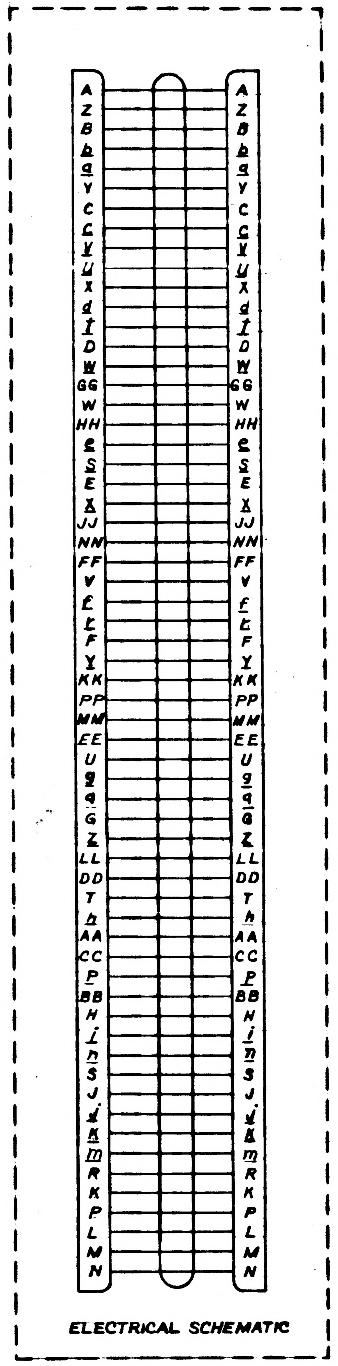
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
	~~CLASS B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 06897 DR. Ken Budd CHK APPD	64	
B	CHANGED PER TDRR 10601 DR. Ken Budd CHK KJ APPD	64	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLACK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLACK	22	4	117	
	7	WHITE	22	5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHITE	22	5	62	


STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 1
STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 2
CUTLINE
CUTLINE
P1
P2
A
A
B
B


7
SEE NOTE 2
3
SEE NOTE 4
7
SEE NOTE 2
A
A
B
B
P1/A6J1
W10
1020042 REV
S/N RAY
P2/A4J6
SEE NOTE 5
1
6
53 LG
2
56.0±1.0


A
Z
B
b
g
Y
C
c
v
u
X
d
f
D
W
GG
W
HH
e
S
E
x
JJ
NN
FF
V
f
F
y
KK
PP
MM
EE
U
g
q
G
Z
LL
DD
T
h
AA
CC
P
BB
H
j
n
S
J
j
k
m
R
K
P
L
M
N

ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0438 DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, FOR FIND NO. 6 AWG 5/8 IN.
4. BOND USING TETRAHYDROFURAN WITH 10 % POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK PER ND1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 3	SLEEVING	6
AR	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELEC	5
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELEC	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61PY	CONNECTOR	2
1	MS3126F-24-61SX	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS .± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN DATE 27 SEP
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SPT APPROVAL

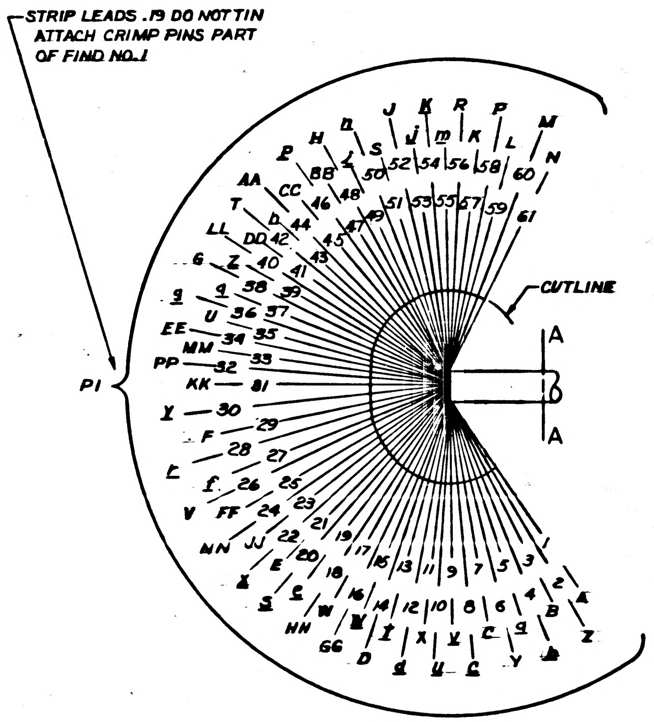
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

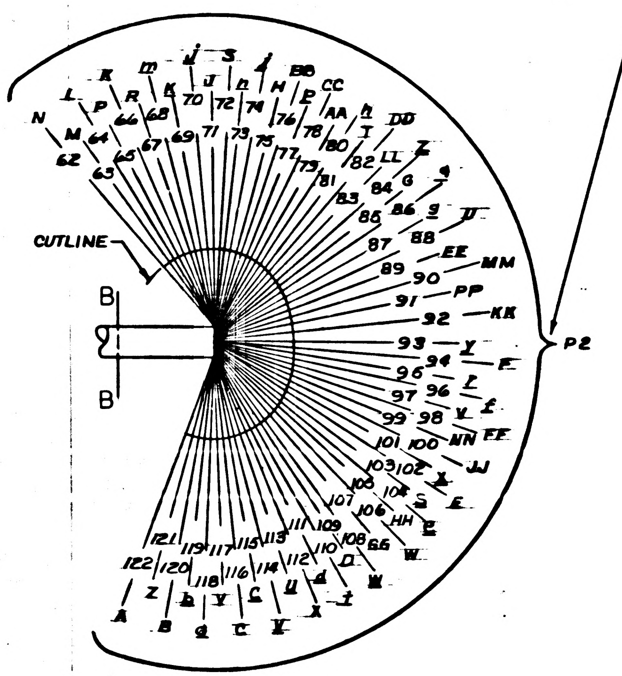
CABLE ASSEMBLY
W10
AGC/CTS OPERATION CONSOLE

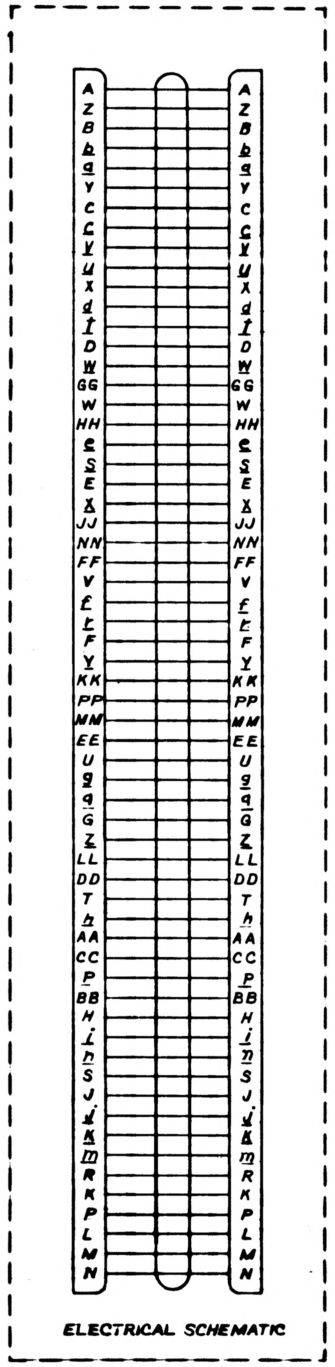
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020042
SCALE 1/1 WT SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
~~-~~	~~CLASS B RELEASED PER TDR~~		
A	CHANGED PER TDRR 06897 DR. Ken Budd CHK W. Wenning APPD J Conley	19 MAR 64	
B	CHANGED PER TDRR 10601 DR. Ken Budd CHK J.J APPD J Conley	20 Jan 64	K.C
C	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	26 MAY 65	

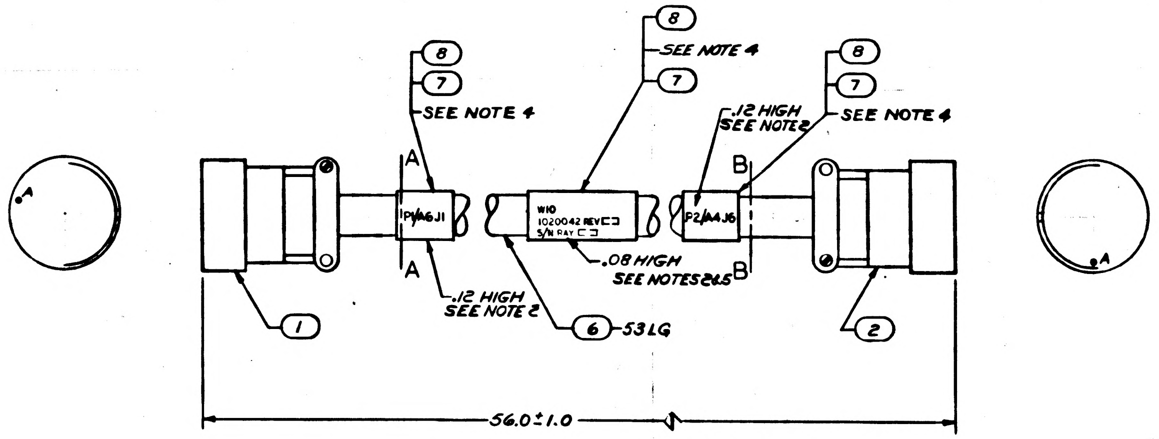
ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLACK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLACK	22	4	117	
	7	WHITE	22	5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHITE	22	5	62	


STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 1
CUTLINE
A
A
P1


STRIP LEADS .19 DO NOT TIN ATTACH CRIMP PINS PART OF FIND NO. 2
CUTLINE
B
B
P2


A Z B b g Y C c y u X d f D W GG W HH e S E x JJ NN FF V £ t F Y KK PP MM EE U g q G Z LL DD T h AA CC P BB H i n S J j K m R K P L M N

ELECTRICAL SCHEMATIC


8
7
SEE NOTE 4
A
A
P1/A6J1
.12 HIGH SEE NOTE 2
1
8
SEE NOTE 4
7
W10 1020042 REV
S/N
.08 HIGH SEE NOTES 2&5
6
53 LG
8
7
.12 HIGH SEE NOTE 2
SEE NOTE 4
B
B
P2/A4J6
2
56.0±1.0
A
A

NOTES

1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. MIL-I-631 TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I,
   FOR FIND NO. 6 AWG 5/8 IN.
4. BOND USING FIND 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	
	3	1014472-4A	BAND MARKER, CABLE	7
*	50	SEE NOTE 3	SLEEVING	6
*	300	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELEC	5
*	30	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELEC	4
	~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
	1	MS3126F-24-61PY	CONNECTOR	2
	1	MS3126F-24-61SX	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN Wendell DATE 27 SEP 63
CHECKED A. Caggiano 5 Oct 63
APPROVAL H. Wiese 14 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MSC APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

CABLE ASSEMBLY
W10
OPERATION CONSOLE

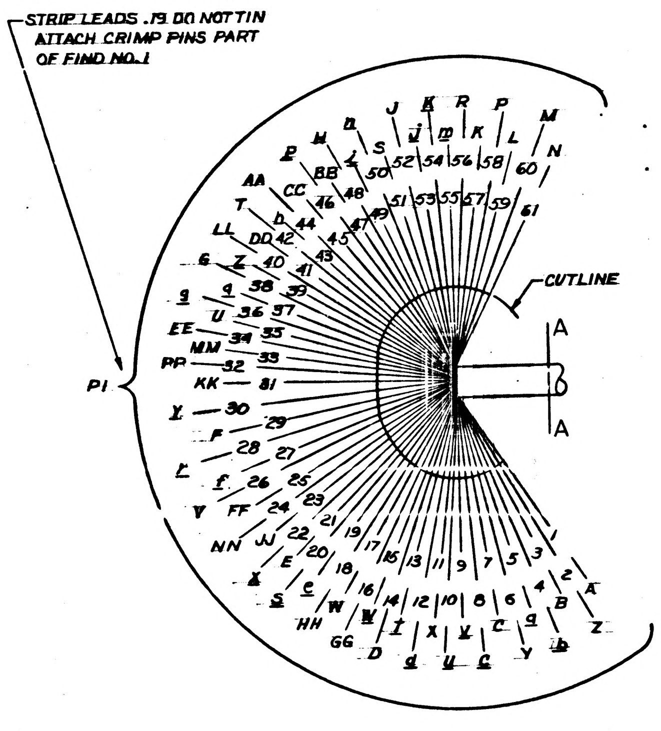
CODE IDENT NO —— SIZE J NASA DRAWING NO 1020042
SCALE 1/1 SHEET 1 OF 1

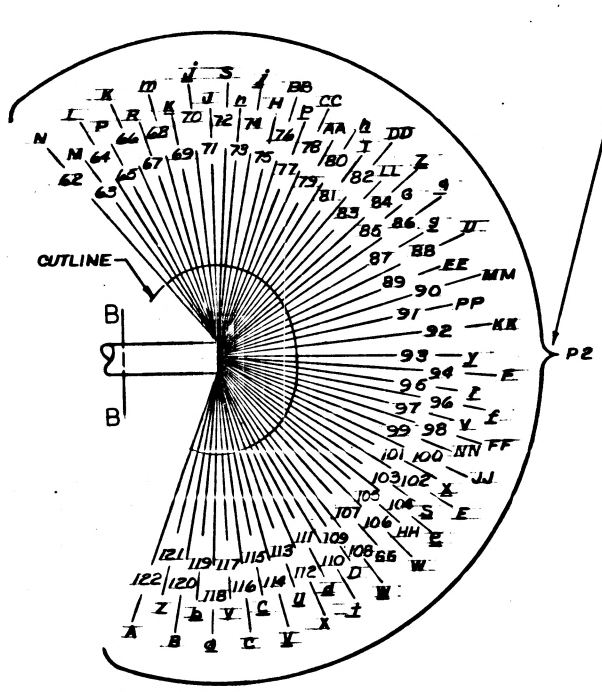
SPUUS01

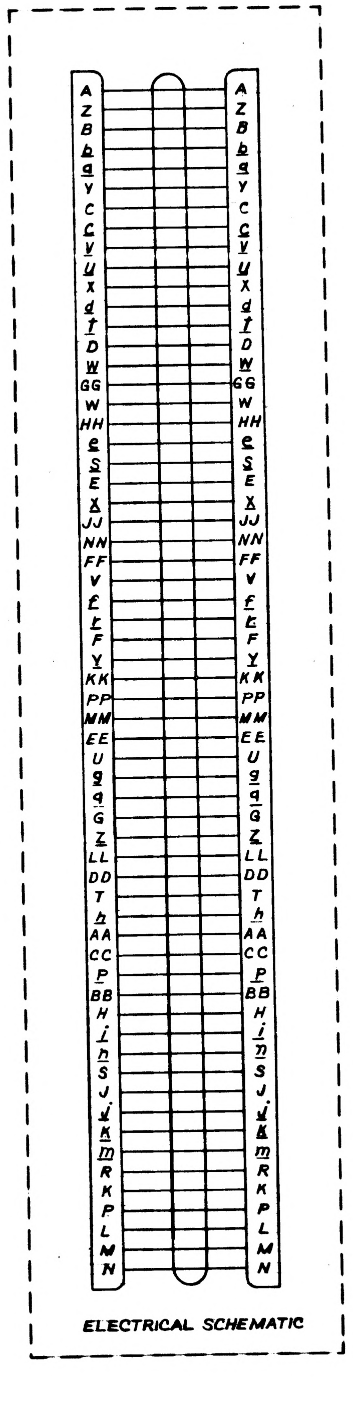
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	~~CLASS B RELEASED PER TDRR 04138~~	5 Oct 63	

ASSEMBLY INFORMATION CHART

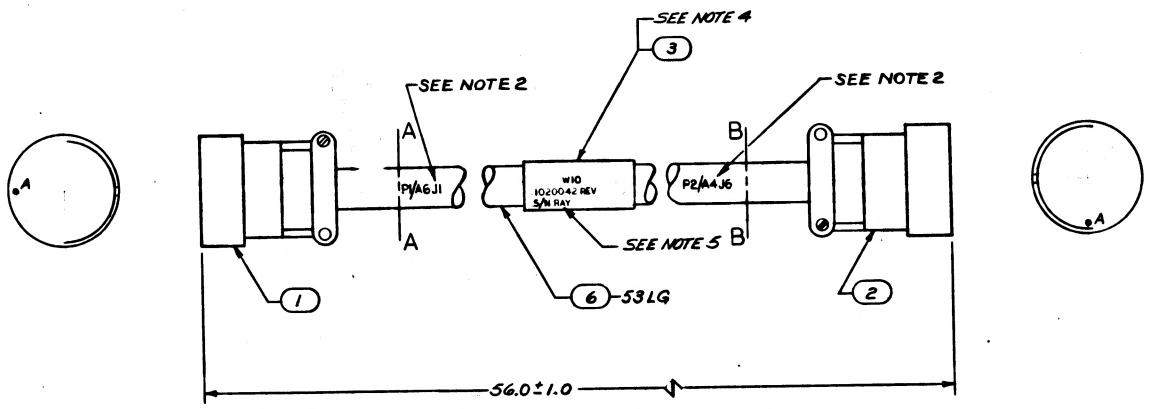
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLACK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLACK	22	4	117	
	7	WHITE	22	5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHITE	22	5	62	


STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART
OF FIND NO. 1
P1
CUTLINE
A
A


STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART
OF FIND NO. 2
P2
CUTLINE
B
B


A Z B b a Y C c y u X d f D W GG W HH e S E x JJ NN FF V £ r F Y KK PP MM EE U g q G Z LL DD T h AA CC P BB H i n S J j K m R K P L M N

ELECTRICAL SCHEMATIC


SEE NOTE 4
3
SEE NOTE 2
SEE NOTE 2
A
A
B
B
P1/A6J1
W10
1020042 REV
S/N RAY
P2/A4J6
SEE NOTE 5
1
6 -53 LG
2
56.0 ± 1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 4 Oct 63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MIL-I-631 TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, FOR FIND NO. 6 AWG 5/8 IN.
4. BOND FIND NO. 3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE.
5. MARK .08 HIGH BLACK PER ND1002023.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	SEE NOTE 3	SLEEVING	6
AR	ND1002181 TYPE 1 CLASS 1	WIRE, ELEC AWG 22, WHITE	5
AR	ND1002181 TYPE 1 CLASS 1	WIRE, ELEC AWG 22, BLACK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-24-61PY	CONNECTOR	2
1	MS3126F-24-61SX	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN Wurndell DATE 27 Sep 63
CHECKED A Coggans 5 Oct 63
APPROVAL 4 Oct 63
APPROVAL 4 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL 24 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

CABLE ASSEMBLY
W10
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020042
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020042

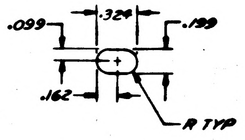
1020042

INCHES
PHOTOGRAPHIC SCALE ONLY

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

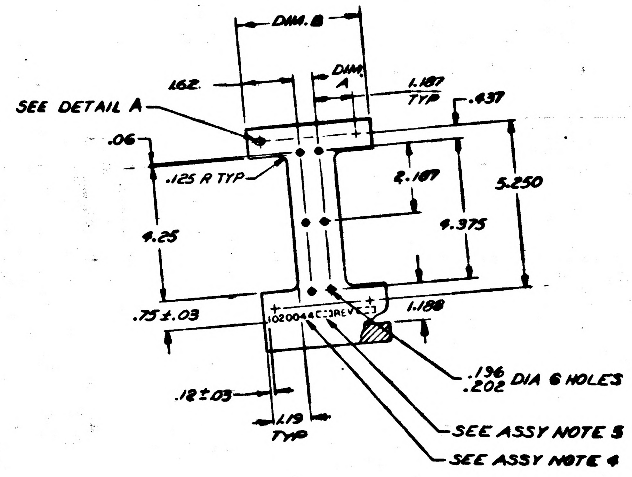
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996		
A	CLASS II CHANGE PER RD-R 5601A DR R F Rose CHK W.J. Gifford APPD	27 DEC 63	
B	CHANGED PER TDRR 08864 DR R Heinlen CHK APPD		KEB

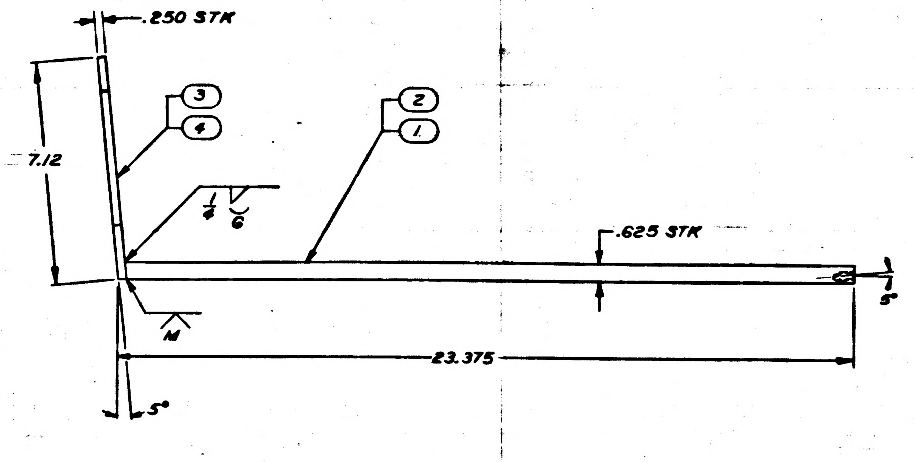
PART NO.	DIM.A	DIM.B	DIM.C	USED WITH TRAY	REV STATUS OF PARTS
1020044-3	—	3.88	.437	EXTENDER A	B
1020044-4	—	4.06	.537	EXTENDER B	B
1020044-5	.625	3.88	—	EXTENDER A	B
1020044-6	.825	4.06	—	EXTENDER B	B

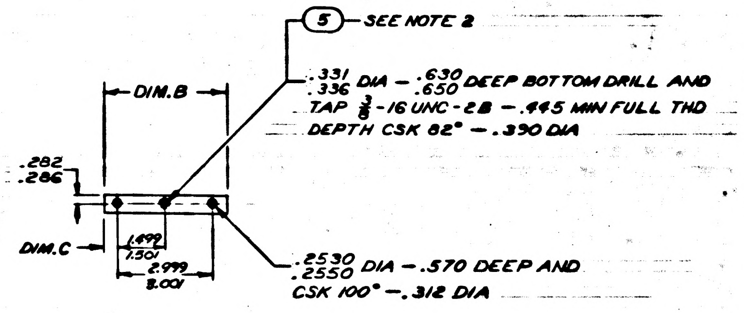

.099
.324
.199
.162
R TYP

DETAIL A
4 PLACES
SCALE 2/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. #3996 DATE 10/17/63


DIM.B
DIM. A
.162
1.187 TYP
.437
SEE DETAIL A
.06
.125 R TYP
2.187
5.250
4.375
4.25
.75±.03
1020044 [ ] REV [ ]
1.188
.196 .202 DIA 6 HOLES
.12±.03
.119 TYP
SEE ASSY NOTE 5
SEE ASSY NOTE 4


.250 STK
7.12
3
4
2
1
1/4 G
.625 STK
5°
M
23.375
5°


5 SEE NOTE 2
DIM.B
.331 .336 DIA — .630 .650 DEEP BOTTOM DRILL AND TAP 3/8-16 UNC-2B — .445 MIN FULL THD DEPTH CSK 82° — .390 DIA
.282 .286
DIM.C
1.499 1.501
2.999 3.001
.2530 .2550 DIA — .570 DEEP AND CSK 100° — .312 DIA

REV STATUS OF ASSY	
PART NO	REV SYMBOL
1020044-1	B
1020044-2	B

① ② ③ ④
NOTES
1. MATL: AL 6061-T6 PER QQ-A-325
2. REMOVE BURRS & SHARP EDGES

-2 -1 ASSY NOTES
1. WELD PER MIL-W-8604
2. INSTALL FIND NO. 5 PER ND1002121, EXCEPT .025 .045 BELOW SURFACE
3. MASK THREADS & ANODIZE PER MIL-A-8625, TYPE II, BLACK
4. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
5. MARK APPLICABLE DASH FIND NO. .12 HIGH WHITE CHARACTERS PER ND1002019
6. HEAT TREAT PER MIL-H-6088 TO TEMPER T6

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1	NAS1394CA-4L	INSERT	5
1	—	1020044-6	PLATE, END	4
—	1	1020044-5	PLATE, END	3
1	—	1020044-4	BRACKET	2
—	1	1020044-3	BRACKET	1
-2	-1	LIST OF MATERIALS		

NEXT ASSY	USED ON
1020054	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 .005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.S. Egan DATE 5 SEPT 63
CHECKED 10 SEPT 63
APPROVAL 20 SEP 63
APPROVAL 9-20-63
NASA APPROVAL 10/11/63
MIT APPROVAL
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, ANGLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020044
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020044

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

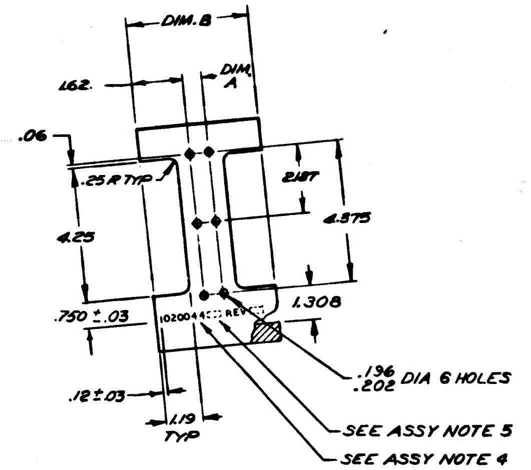
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

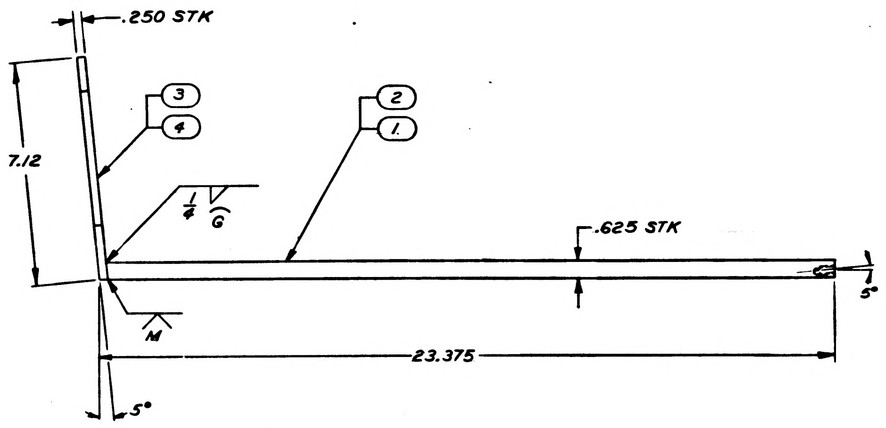
REVISIONS

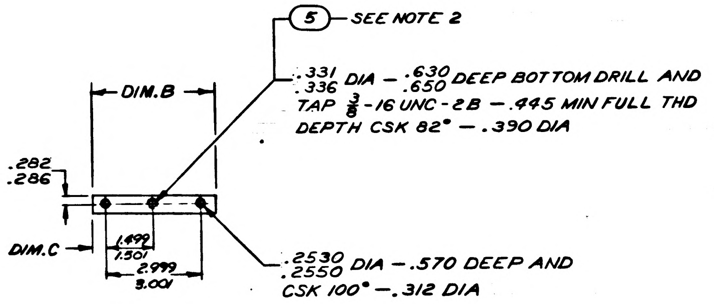
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03996	17Oct63	WK

PART NO.	DIM.A	DIM.B	DIM.C	USED WITH TRAY	REV STATUS OF PARTS
1020044-3	—	3.88	.437	EXTENDER A	—
1020044-4	—	4.06	.537	EXTENDER B	—
1020044-5	.625	3.88	—	EXTENDER A	—
1020044-6	.825	4.06	—	EXTENDER B	—

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03996 DATE 10/17/63


DIM.B
.162
DIM. A
.06
.25R TYP
2.187
4.375
4.25
1.308
.750 ± .03
1020044-□ REV □
.12 ± .03
1.19 TYP
.196 .202 DIA 6 HOLES
SEE ASSY NOTE 5
SEE ASSY NOTE 4


.250 STK
7.12
3
4
2
1
1/4 G
.625 STK
5°
M
23.375
5°


5 — SEE NOTE 2
DIM.B
.331 .336 DIA — .630 .650 DEEP BOTTOM DRILL AND TAP 3/8-16 UNC-2B — .445 MIN FULL THD DEPTH CSK 82° — .390 DIA
.282 .286
DIM.C
1.499 1.501
2.999 3.001
.2530 .2550 DIA — .570 DEEP AND CSK 100° — .312 DIA

REV STATUS OF ASSY	
PART NO	REV SYMBOL
1020044-1	—
1020044-2	—

①②③④
NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES

-2 -1 ASSY NOTES
1. WELD PER MIL-W-8604
2. INSTALL FIND NO. 5 PER ND1002121, EXCEPT $\frac{.025}{.045}$ BELOW SURFACE
3. MASK THREADS & ANODIZE PER MIL-A-8625, TYPE II, BLACK
4. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
5. MARK APPLICABLE DASH FIND NO. .12 HIGH WHITE CHARACTERS PER ND1002019

QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1	NAS1394CA-4L	INSERT	5
1	—	1020044-6	PLATE, END	4
—	1	1020044-5	PLATE, END	3
1	—	1020044-4	BRACKET	2
—	1	1020044-3	BRACKET	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020054	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 .005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 5 SEP 63
CHECKED 10 SEPT 63
APPROVAL 20 SEP 63
APPROVAL 9-20-63
10/1/63
NASA APPROVAL 10/17/63
MIT APPROVAL 10/4/63
MIT APPROVAL 17 Oct 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, ANGLE

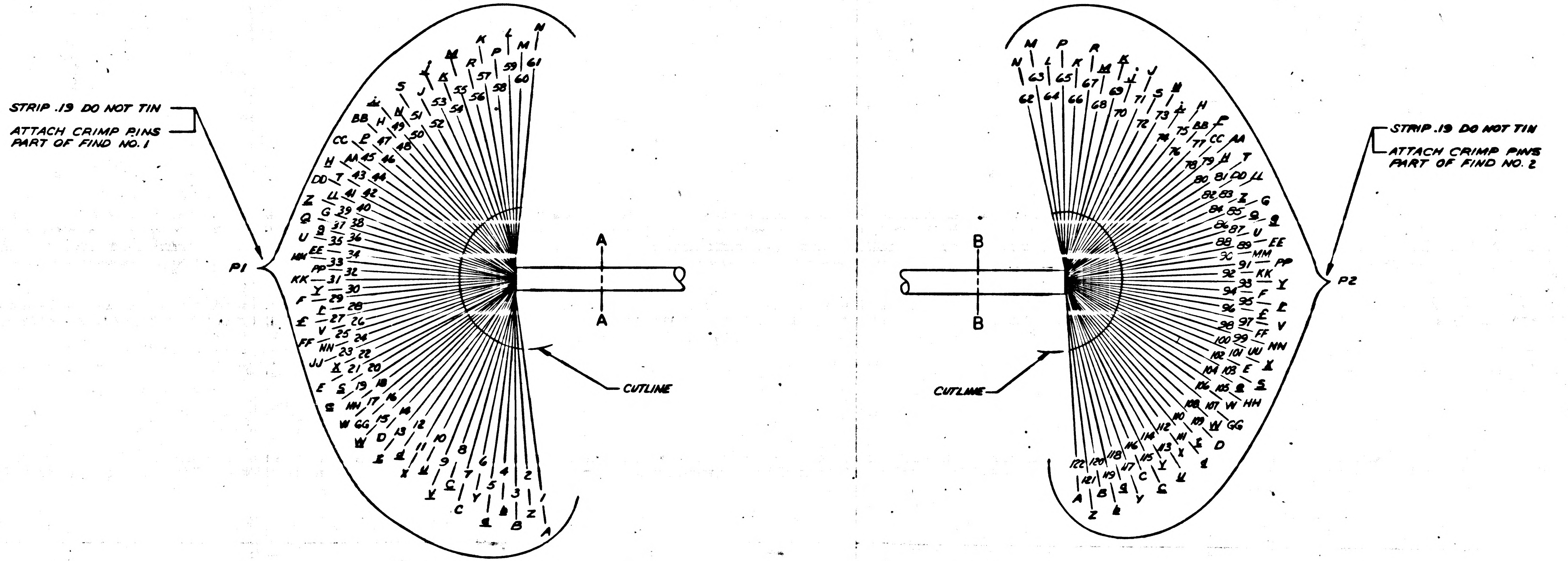
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020044
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

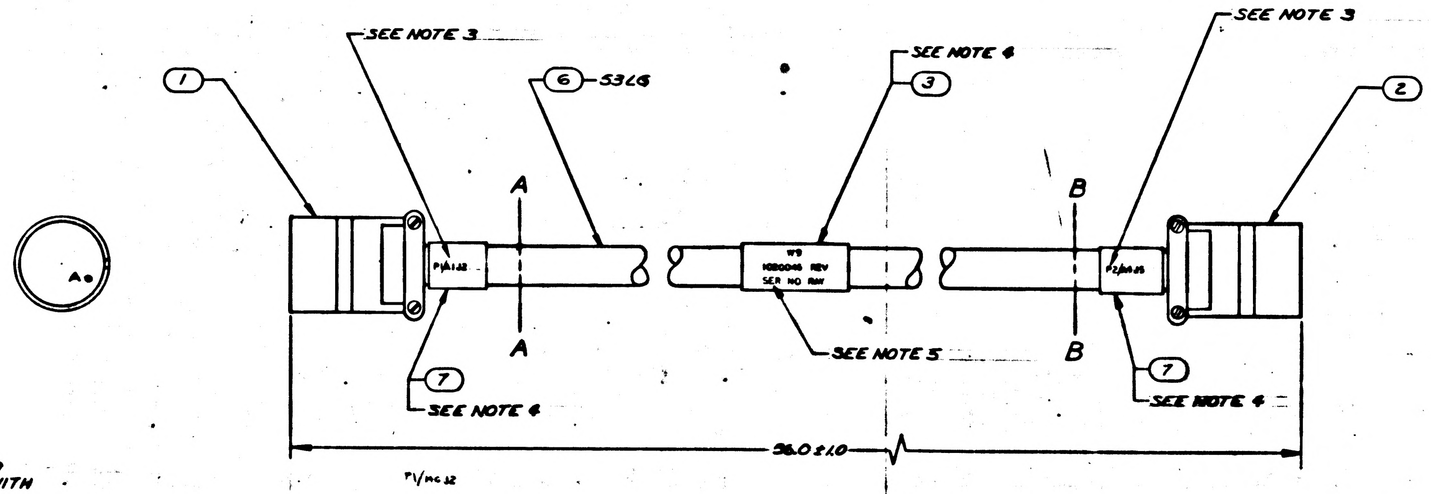
INCHES
PHOTOGRAPHIC SCALE ONLY

1020045

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 06766 DR. [illegible] CHKD J.J.J.W APPD [illegible]	[illegible]	[illegible]



STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 1
P1
A
A
CUTLINE
B
B
CUTLINE
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2
P2



SEE NOTE 3
1
6
53LG
SEE NOTE 4
3
SEE NOTE 3
2
A
A
P1/A1-12
W9 1020045 REV SER NO. AW
SEE NOTE 5
B
B
P2/A1-26
7
SEE NOTE 4
7
SEE NOTE 4
56.0 ± 1.0
P1/MC12

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032.
2. MIL-I-631 TYPE F, FORM U8, GRADE A CLASS I CATEGORY I FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .08 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

A	—
—	—
SHEET 1	SHEET 2

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	MIL-W-16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	5
AR	MIL-W-16878/4 TYPE E 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61PX	CONNECTOR	2
1	MS3126F-24-61SZ	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE 9-4-63
CHECKED A. Caggiano 9 Oct 63
APPROVAL [illegible] 28 Oct 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

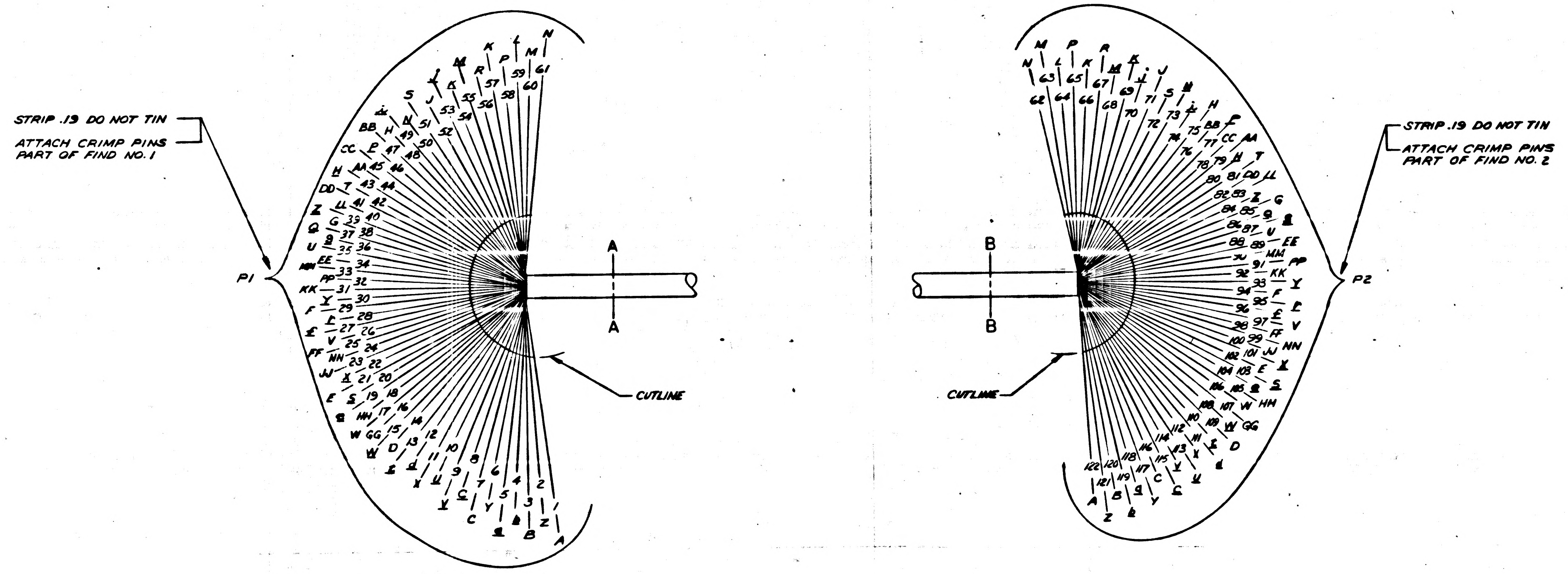
CABLE ASSEMBLY
W9
AGC/CTS OPERATION CONSOLE

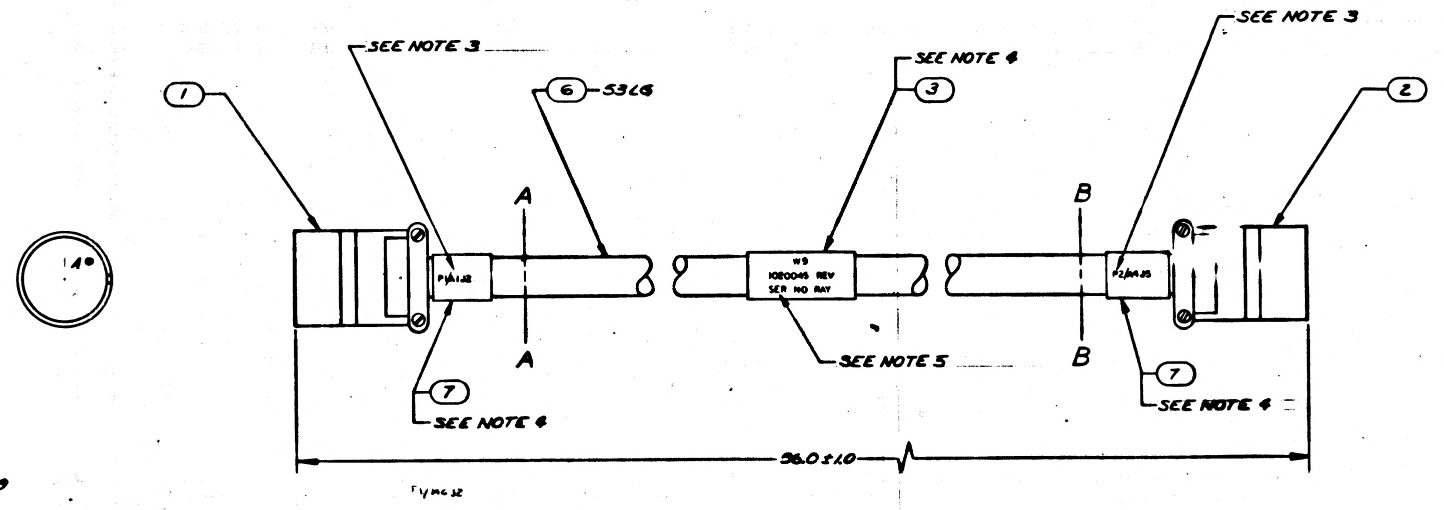
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020045
SCALE 1/2
SHEET 1 OF 2

MASTER

1020045

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 06766 DR. CHKD APPD		
B	CHANGED PER TDRR 10597 DR CHK. APPD.		


STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 1
P1
A
A
CUTLINE
B
B
CUTLINE
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2
P2


1
SEE NOTE 3
6
53 LG
SEE NOTE 4
3
SEE NOTE 3
2
A
A
P1/A1J2
W9
1020045 REV
SER NO RAY
SEE NOTE 5
B
B
P2/A4J5
7
SEE NOTE 4
7
SEE NOTE 4
56.0 ± 1.0

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 4/5/63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032.
2. MIL-I-631 TYPE F, FORM U8, GRADE A CLASS I CATEGORY I FOR FIND NO. 6 AWG 5/8 IN.
3. MARK .08 HIGH BLACK CHARACTERS PER ND1002019
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

B	–
A	–
–	–
SHEET 1	SHEET 2

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-4A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	MIL-W-16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	5
AR	MIL-W-16878/4 TYPE E 22 BLK	WIRE, ELECTRICAL	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61PX	CONNECTOR	2
1	MS3126F-24-61SZ	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

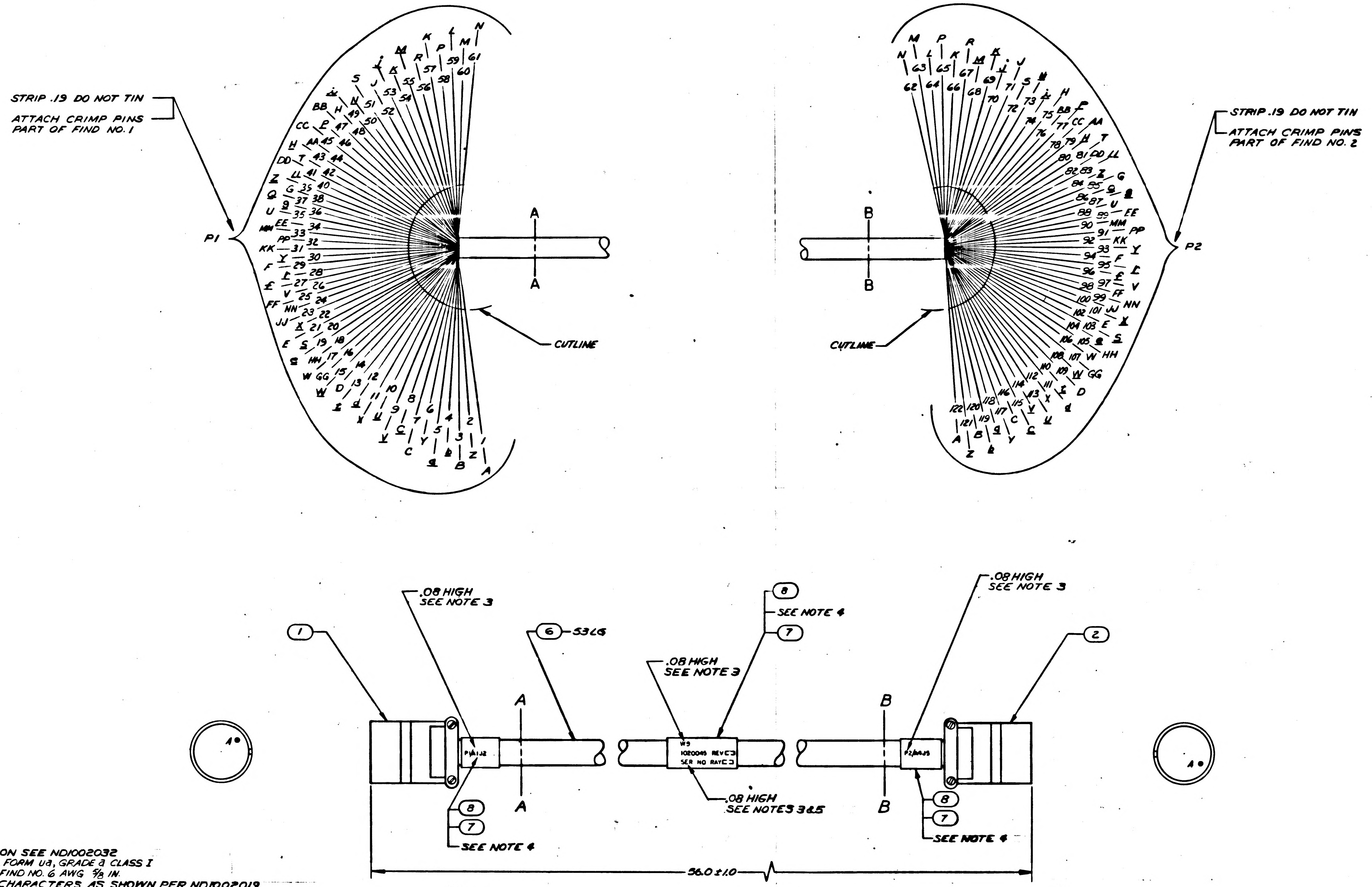
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 9-4-62
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W9
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020045
SCALE 1/2
WT
SHEET 1 OF 2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 06766 DR. CHKD APPD		
B	CHANGED PER TDRR 10597 DR CHK. APPD.	64	
C	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	28 MAY 65	


STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 1
P1
A
A
CUTLINE
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2
P2
B
B
CUTLINE
1
.08 HIGH SEE NOTE 3
6 – 53 LG
8
7
SEE NOTE 4
.08 HIGH SEE NOTE 3
W9
1020045 REV
SER NO RAY
.08 HIGH SEE NOTES 3 & 5
8
7
SEE NOTE 4
.08 HIGH SEE NOTE 3
2
8
7
SEE NOTE 4
56.0 ± 1.0
A°
A°

NOTES
1. FOR FABRICATION SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua, GRADE a CLASS I CATEGORY I FOR FIND NO. 6 AWG 5/8 IN.
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

*DENOTES LENGTH IN FEET

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006253	ADHESIVE	8
3	1014472-4A	BAND MARKER, CABLE	7
* 5.0	SEE NOTE 2	SLEEVING	6
* 275	MIL W 16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	5
* 30	MIL-W-16878/4 TYPE E 22 BLK	WIRE ELECTRICAL	4
~~1~~	~~1014472-A~~	~~BAND MARKER, CABLE~~	~~3~~
1	MS3126F-24-61PX	CONNECTOR	2
1	MS3126F-24-61SZ	CONNECTOR	1

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS ± ANGLE ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY	USED ON
1014465	
APPLICATION	

DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

CABLE ASSEMBLY
W9
OPERATION CONSOLE

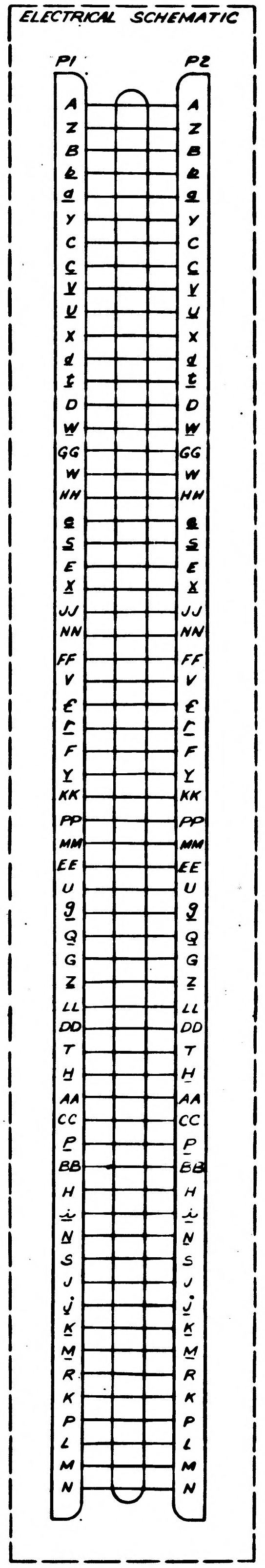
CODE IDENT NO —— SIZE J NASA DRAWING NO 1020045
SCALE 1/1 WT SHEET 1 OF 2

1020045 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		
C	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	28 MAY 65	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLK		4	117	
	7	WHT		5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHT	22	5	62	



MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

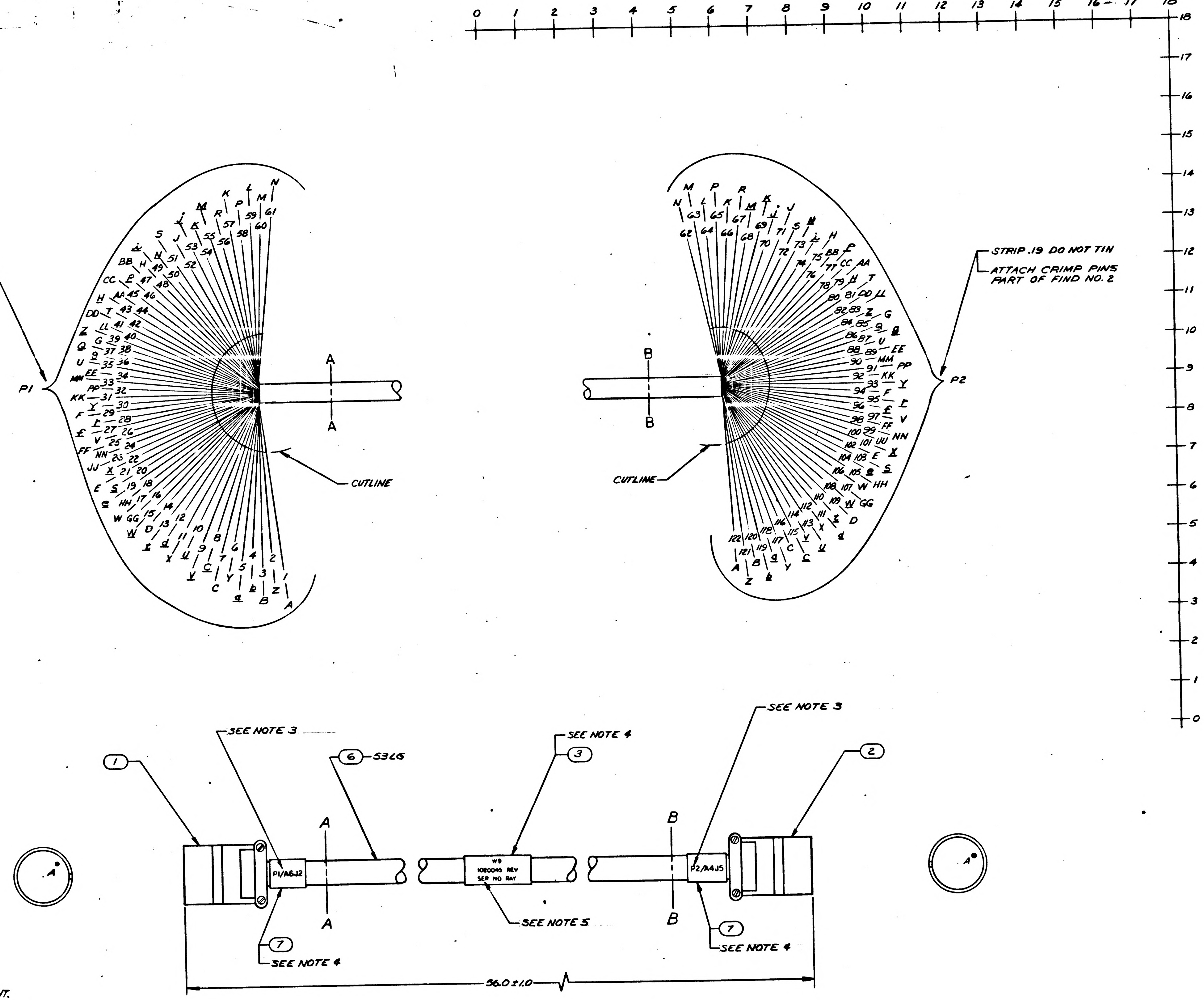
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

CABLE ASSEMBLY
W9
OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020045
SCALE NONE
WT
SHEET 2 OF 2

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		


STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 1
P1
CUTLINE
A
STRIP .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO. 2
P2
CUTLINE
B
SEE NOTE 3
①
⑥ -53L6
SEE NOTE 4
③
SEE NOTE 3
②
P1/A6J2
W9 1020045 REV SER NO RAY
P2/A4J5
SEE NOTE 5
⑦
SEE NOTE 4
⑦
SEE NOTE 4
56.0±1.0
A
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032.
2. MIL-I-631 TYPE F, FORM U8, GRADE A CLASS I CATEGORY I FOR FIND NO. 6 AWG 5/8 IN. COLOR WHT.
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-3A	BAND MARKER, CABLE	7
AR	SEE NOTE 2	SLEEVING	6
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL AWG 22 WHT	5
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL AWG 22 BLK	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-24-61PX	CONNECTOR	2
1	MS3126F-24-61SZ	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/4 DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH
— —

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 9-4-63
CHECKED A Caggiano 2 Oct 63
APPROVAL 28 Oct 63
APPROVAL 28 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

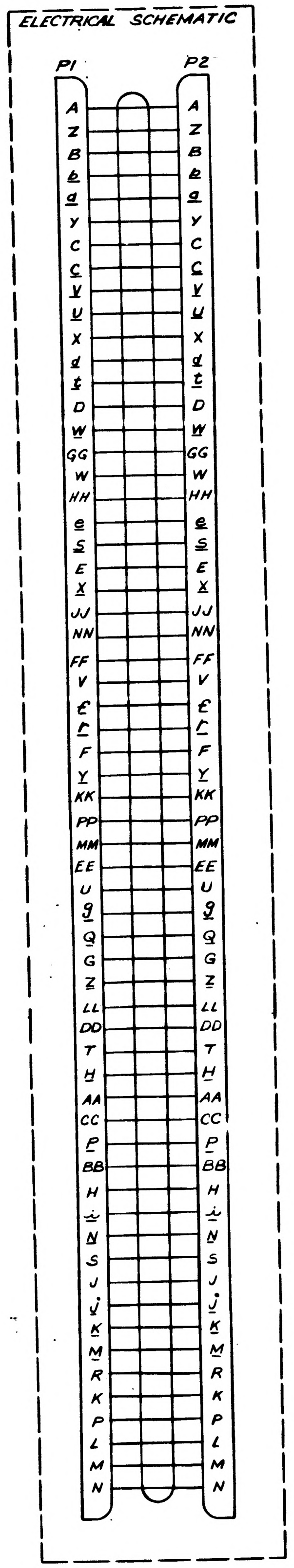
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W9
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020045
SCALE 1/1
WT
SHEET 1 OF 2

REVISIONS			
SYM	DESCRIPTION	DAT	APPROVED
—	CLASS B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	4	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLK		4	117	
	7	WHT		5	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHT	22	5	62	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
DATE
CHECKED
APPROVAL 28 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W9
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020045
SCALE NONE
WT
SHEET 2 OF 2

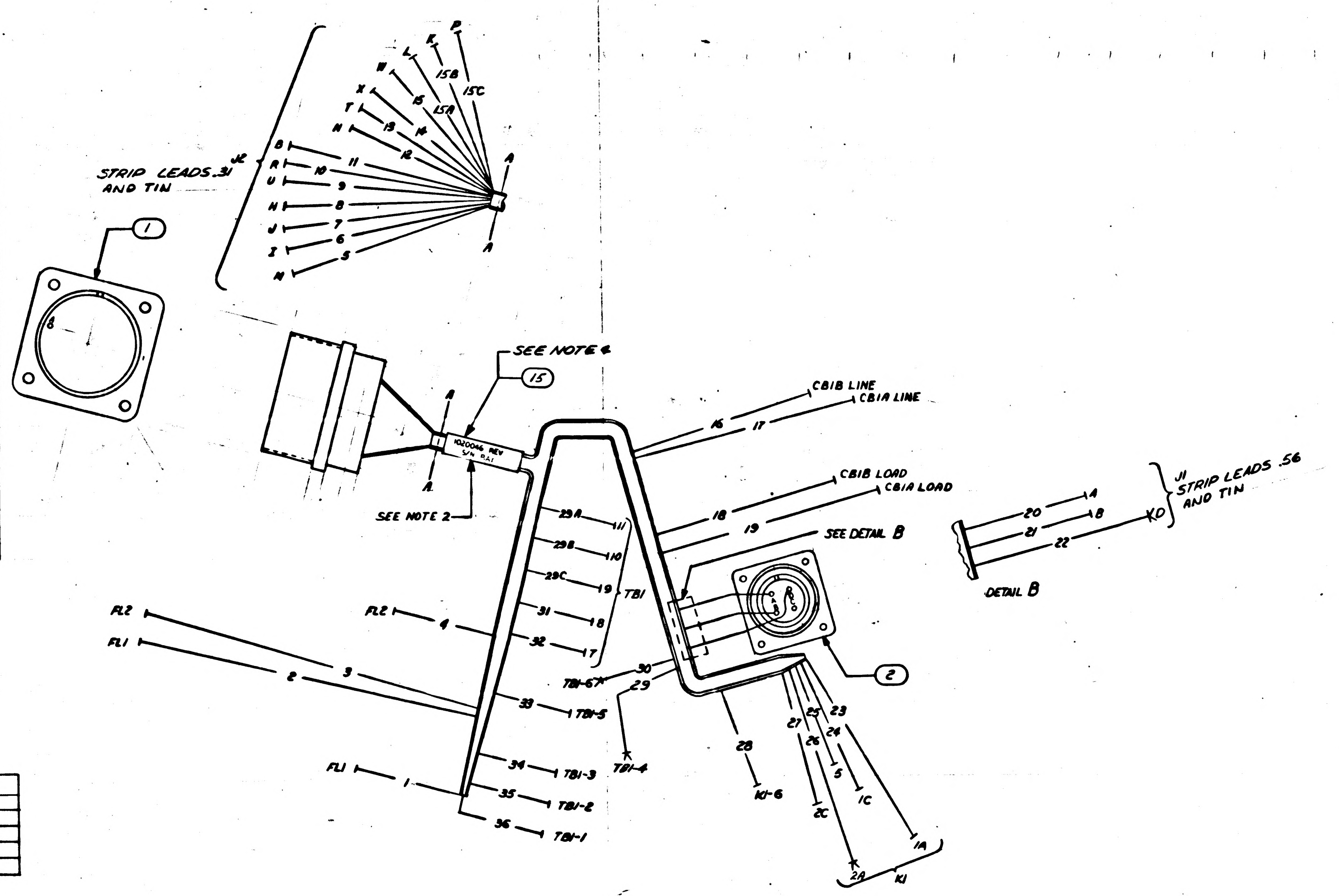
INCHES
PHOTOGRAPHIC SCALE ONLY

1015001

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 06901 DR. Ken Bedell CHK. APPD	13 MAR 64	KEB

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	5	WHT/BLK/GY	18	3	36	ATTACH FIND NO. 10
ATTACH FIND NO. 10	35				6	SEE TWIST CHART
	15A				29C	ATTACH FIND NO. 10
ATTACH FIND NO. 10	33				9	
ATTACH FIND NO. 12	28				22	
ATTACH FIND NO. 12	25				11	SEE TWIST CHART
	22	WHT/BLK/GY	10	4	29	ATTACH FIND NO. 11
ATTACH FIND NO. 11	29	WHT/BLK/GY	12	5	8	SEE TWIST CHART
ATTACH FIND NO. 13	23	WHT/BRN/GY	12	6	19	ATTACH FIND NO. 14
ATTACH FIND NO. 14	17				4	ATTACH FIND NO. 14
ATTACH FIND NO. 14	3				20	
ATTACH FIND NO. 13	24				12	SEE TWIST CHART
ATTACH FIND NO. 11	30				13	SEE TWIST CHART
SEE TWIST CHART	14	WHT/BRN/GY	18	7	32	ATTACH FIND NO. 10
ATTACH FIND NO. 10	31				15	SEE TWIST CHART
ATTACH FIND NO. 11	30	WHT/RED/GY	12	8	27	ATTACH FIND NO. 13
ATTACH FIND NO. 13	26				18	ATTACH FIND NO. 14
ATTACH FIND NO. 14	16				1	ATTACH FIND NO. 14
ATTACH FIND NO. 14	2				21	
ATTACH FIND NO. 12	26	WHT/RED/GY	18	9	10	
	15C	WHT/BLK/GY	18	3	29A	ATTACH FIND NO. 10
	15B	WHT/BLK/GY	18	3	29B	ATTACH FIND NO. 10
SEE TWIST CHART	7	WHT/BLK/GY	12	5	34	ATTACH FIND NO. 11


STRIP LEADS .31 AND TIN
J2
B
R
U
N
J
I
M
T
X
W
L
K
P
15B
15C
15A
13
14
12
11
10
9
8
7
6
5
A
A
①
SEE NOTE 4
⑮
1020046 REV
SEE NOTE 2
A
CB1B LINE
CB1A LINE
16
17
CB1B LOAD
CB1A LOAD
18
19
SEE DETAIL B
29A
29B
29C
31
32
33
34
35
36
11
10
9
TB1
8
7
6
5
TB1-4
TB1-3
TB1-2
TB1-1
FL2
FL1
FL2
FL1
4
3
2
1
TB1-6
30
29
28
K1-6
27
26
25
24
23
2C
5
1C
2A
1A
K1
②
J1
STRIP LEADS .56 AND TIN
20
21
22
A
B
D
DETAIL B

TWIST CHART
5-36 WITH 31-15
35-6 WITH 19-32
7-34 WITH 30-13
29-8 WITH 24-12
26-10 WITH 25-11

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/1/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .08 HIGH CHARACTERS PER ND1002023
3. SOLDER PER MIL-S-6872
4. BOND FIND NO. 15 USING TETRAHYDROFURAN WITH 10% POLVINYL CHLORIDE
5. STRIP LEADS .25 & UNLESS OTHERWISE SPECIFIED DO NOT TIN

☒	1014368	SCHEMATIC	REF
1	1014472-2	BAND MARKER, CABLE	15
8	MS25036-12	LUG, TERMINAL	14
4	MS25036-56	LUG, TERMINAL	13
3	MS25036-49	LUG, TERMINAL	12
5	MS25036-11	LUG, TERMINAL	11
8	MS25036-2	LUG, TERMINAL	10
AR	MIL-W-16878/4, TYPE E, 18 WHT/RED/GY	WIRE, ELEC	9
AR	12 WHT/RED/GY	WIRE, ELEC	8
AR	18 WHT/BRN/GY	WIRE, ELEC	7
AR	12 WHT/BRN/GY	WIRE, ELEC	6
AR	12 WHT/BLK/GY	WIRE, ELEC	5
AR	10 WHT/BLK/GY	WIRE, ELEC	4
AR	MIL-W-16878/4, TYPE E, 18 WHT/BLK/GY	WIRE, ELEC	3
1	MS3102A-22-22P	CONNECTOR	2
1	MS3102A-36-9S	CONNECTOR	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014416	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED
APPROVAL 28 Oct 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
AC INPUT PANEL
AGC/CTS OPERATION CONSOLE

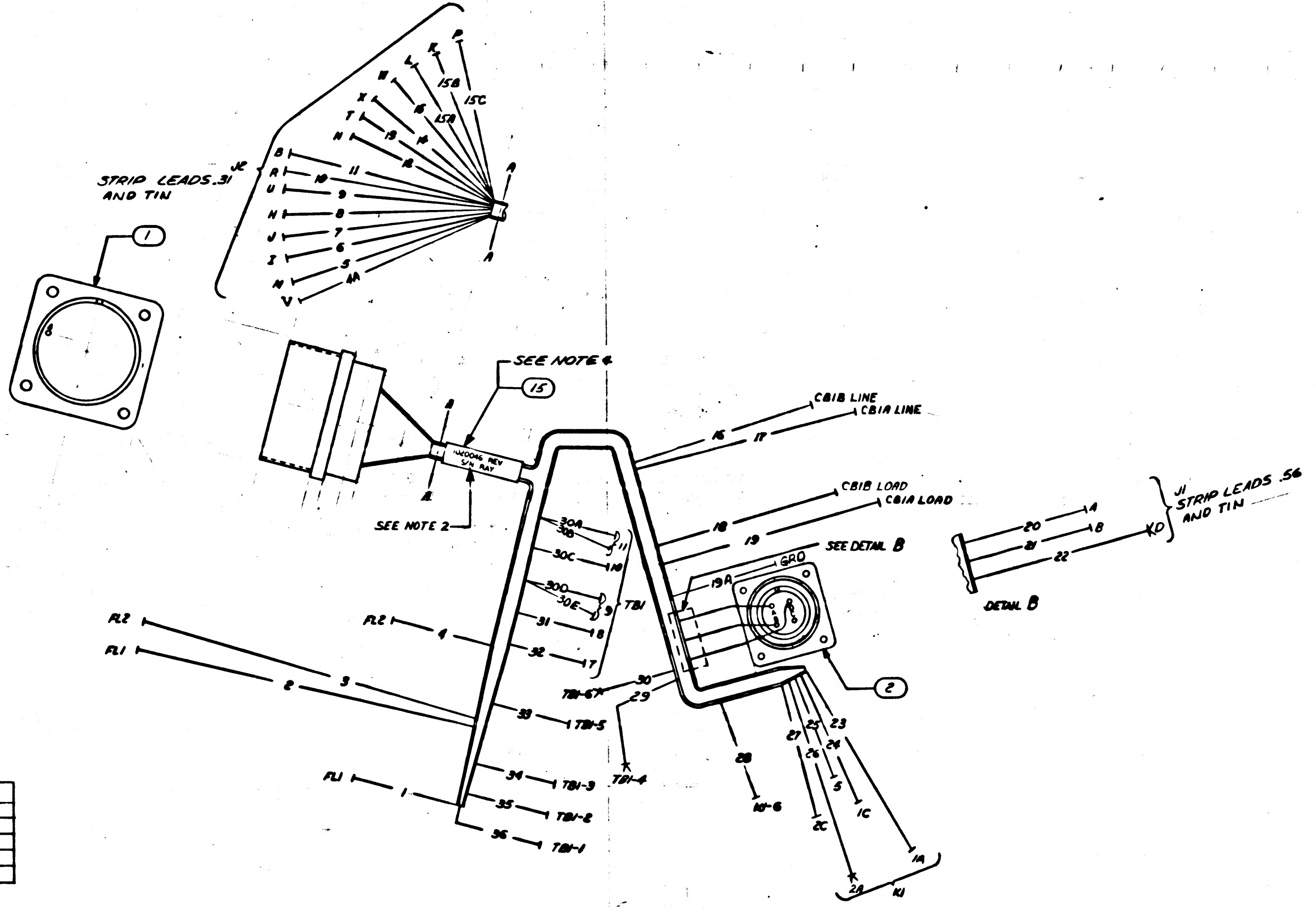
CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020046
SCALE 1/1 WT SHEET 1 OF

1020046

10120046

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR		
A	CHANGED PER TDRR 06901 DR. Ken Budd CHK APPD	MAR '64	KEB
B	CHANGED - PER TDRR 10275 DR R CHK APPD	21 Jul 64	

ASSEMBLY DESIGNATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	5	WHT/BLK/GY	18	3	36	ATTACH FIND NO. 10
ATTACH FIND NO. 10	35				6	SEE TWIST CHART
	15A				30 D	ATTACH FIND NO. 10
ATTACH FIND NO. 10	33				9	
ATTACH FIND NO. 12	28				22	
ATTACH FIND NO. 12	25				11	SEE TWIST CHART
	22	WHT/BLK/GY	10	4	29	ATTACH FIND NO. 11
ATTACH FIND NO. 11	29	WHT/BLK/GY	12	5	8	SEE TWIST CHART
ATTACH FIND NO. 13	23	WHT/BRN/GY	12	6	19	ATTACH FIND NO. 14
ATTACH FIND NO. 14	17				4	ATTACH FIND NO. 14
ATTACH FIND NO. 14	3				20	
ATTACH FIND NO. 13	24				12	SEE TWIST CHART
ATTACH FIND NO. 11	30				13	SEE TWIST CHART
SEE TWIST CHART	14	WHT/BRN/GY	18	7	32	ATTACH FIND NO. 10
ATTACH FIND NO. 10	31				15	SEE TWIST CHART
ATTACH FIND NO. 11	30	WHT/RED/GY	12	8	27	ATTACH FIND NO. 13
ATTACH FIND NO. 13	26				18	ATTACH FIND NO. 14
ATTACH FIND NO. 14	16				1	ATTACH FIND NO. 14
ATTACH FIND NO. 14	2				21	
ATTACH FIND NO. 12	26	WHT/RED/GY	18	9	10	
	15C	WHT/BLK/GY	18	3	30A	ATTACH FIND NO. 10
	15B	WHT/BLK/GY	18	3	30C	ATTACH FIND NO. 10
SEE TWIST CHART	7	WHT/BLK/GY	12	5	34	ATTACH FIND NO. 11
	4A	BLK	12	16	30E	ATTACH FIND NO. 10
ATTACH FIND NO. 10	30B				19A	ATTACH FIND NO. 11



TWIST CHART
5-36 WITH 31-15
35-6 WITH 19-32
7-34 WITH 30-13
29-8 WITH 24-12
26-10 WITH 25-11

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .08 HIGH CHARACTERS PER ND1002023
3. SOLDER PER MIL-S-6872
4. BOND FIND NO. 15 USING TETRAHYDROFURAN WITH 10% POLVINYL CHLORIDE
5. STRIP LEADS .25 & UNLESS OTHERWISE SPECIFIED DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	MIL-W-16878/4 TYPE E, 12 BLK	WIRE ELEC	16
☒	1014368	SCHEMATIC	REF
1	1014472-2	BAND MARKER, CABLE	15
8	MS25036-12	LUG, TERMINAL	14
4	MS25036-56	LUG, TERMINAL	13
3	MS25036-49	LUG, TERMINAL	12
6	MS25036-11	LUG, TERMINAL	11
10	MS25036-2	LUG, TERMINAL	10
AR	MIL-W-16878/4, TYPE E, 18 WHT/RED/GY	WIRE, ELEC	9
AR	12 WHT/RED/GY	WIRE, ELEC	8
AR	18 WHT/BRN/GY	WIRE, ELEC	7
AR	12 WHT/BRN/GY	WIRE, ELEC	6
AR	12 WHT/BLK/GY	WIRE, ELEC	5
AR	10 WHT/BLK/GY	WIRE, ELEC	4
AR	MIL-W-16878/4, TYPE E, 18 WHT/BLK/GY	WIRE, ELEC	3
1	MS3102A-22-22P	CONNECTOR	2
1	MS3102A-36-9S	CONNECTOR	1

LIST OF MATERIALS

1014416	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL 28 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
ENT APPROVAL
ENT APPROVAL 11/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
AC INPUT PANEL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020046
SCALE 1/1
WT
SHEET 1 OF 1

1020046

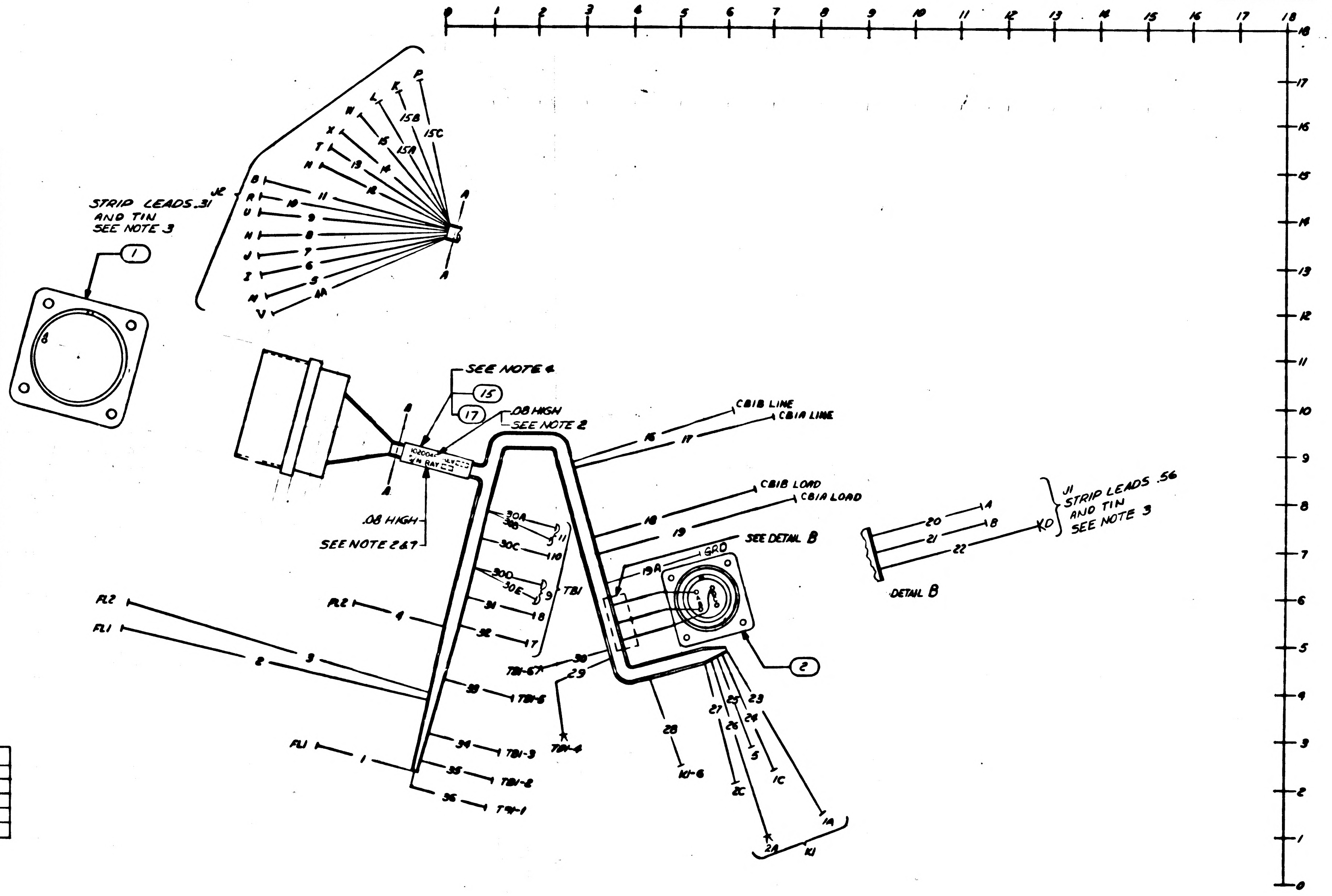
10120046

1015004

SYM	DESCRIPTION	DATE	APPROVED
—	CLE RELEASED PER TDRR		
A	CHANGED PER TDRR 06901 DR. Ken Budd CHK. APPD.	19 MAR 64	
B	CHANGED - PER TDRR 10275 DR R CHK APPD.	24 Jul 64	
C	UPDATE TO CLASS A WITH CHANGES PER TDRR 18709 DR CHK APPD	18 MAY 65	14

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	5	WHT/BLK/GY	18	3	36	ATTACH FIND NO. 10
ATTACH FIND NO. 10	35				6	SEE TWIST CHART
	15A				30 D	[illegible] CH FIND NO. 10
ATTACH FIND NO. 10	33				9	
ATTACH FIND NO. 12	28				22	
ATTACH FIND NO. 12	25				11	SEE TWIST CHART
	22	WHT/BLK/GY	10	4	29	ATTACH FIND NO. 11
ATTACH FIND NO. 11	29	WHT/BLK/GY	12	5	8	SEE TWIST CHART
ATTACH FIND NO. 13	23	WHT/BRN/GY	12	6	19	ATTACH FIND NO. 14
ATTACH FIND NO. 14	17				4	ATTACH FIND NO. 14
ATTACH FIND NO. 14	3				20	
ATTACH FIND NO. 13	24				12	SEE TWIST CHART
ATTACH FIND NO. 11	30				13	SEE TWIST CHART
SEE TWIST CHART	14	WHT/BRN/GY	18	7	32	ATTACH FIND NO. 10
ATTACH FIND NO. 10	31				15	SEE TWIST CHART
ATTACH FIND NO. 11	30	WHT/RED/GY	12	8	27	ATTACH FIND NO. 13
ATTACH FIND NO. 13	26				18	ATTACH FIND NO. 14
ATTACH FIND NO. 14	16				1	ATTACH FIND NO. 14
ATTACH FIND NO. 14	2				21	
ATTACH FIND NO. 12	26	WHT/RED/GY	18	9	10	
	15C	WHT/BLK/GY	18	3	30A	ATTACH FIND NO. 10
	15B	WHT/BLK/GY	18	3	30C	ATTACH FIND NO. 10
SEE TWIST CHART	7	WHT/BLK/GY	12	5	34	ATTACH FIND NO. 11
	4A	BLK	12	16	30 E	ATTACH FIND NO. 10
ATTACH FIND NO. 10	30B				19 A	ATTACH FIND NO. 11


STRIP LEADS .31
AND TIN
SEE NOTE 3
1
J2
B
R
U
H
J
I
M
V
N
T
X
W
L
K
P
15B
15C
15
15A
14
13
12
11
10
9
8
7
6
5
4A
A
A
SEE NOTE 4
15
17
.08 HIGH
SEE NOTE 2
.08 HIGH
SEE NOTE 2&7
1020046
S/N RAY
CB1B LINE
CB1A LINE
16
17
CB1B LOAD
CB1A LOAD
18
19
SEE DETAIL B
GRD
19A
2
30A
30B
11
30C
10
30D
30E
9
TB1
31
8
32
7
FL2
4
FL2
FL1
3
2
TB1-6
30
29
33
TB1-5
TB1-4
FL1
1
34
TB1-3
35
TB1-2
36
TB1-1
28
K1-6
27
26
25
24
23
2C
5
1C
1A
2A
K1
J1
STRIP LEADS .56
AND TIN
SEE NOTE 3
20
21
22
A
B
D
DETAIL B
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

TWIST CHART
5-36 WITH 31-15
35-6 WITH 14-32
7-34 WITH 30-13
29-8 WITH 24-12
26-10 WITH 25-11

NOTES
1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. SOLDER PER ND1002071
4. BOND USING FIND NO. 17
5. STRIP LEADS .25 & UNLESS OTHERWISE SPECIFIED DO NOT TIN
6. CRIMP PER ND1002206
7. SERIALIZE PER ND1002023

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	AR	1006253	ADHESIVE	—
*	0.8	MIL-W-16878/4 TYPE E, 12 BLK	WIRE ELEC	16
	☒	1014368	SCHEMATIC	REF
	1	1014472-2A	BAND MARKER, CABLE	15
	8	MS25036-12	LUG, TERMINAL	14
	4	MS25036-56	LUG, TERMINAL	13
	3	MS25036-49	LUG, TERMINAL	12
	6	MS25036-11	LUG, TERMINAL	11
	10	MS25036-2	LUG, TERMINAL	10
*	1.6	MIL-W-16878/4, TYPE E, 18 WHT/RED/GY	WIRE, ELEC	9
*	.6	12 WHT/RED/GY	WIRE, ELEC	8
*	1.8	18 WHT/BRN/GY	WIRE, ELEC	7
*	6.4	12 WHT/BRN/GY	WIRE, ELEC	6
*	1.4	12 WHT/BLK/GY	WIRE, ELEC	5
*	1.0	10 WHT/BLK/GY	WIRE, ELEC	4
*	7.9	MIL-W-16878/4, TYPE E, 18 WHT/BLK/GY	WIRE, ELEC	3
	1	MS3102A-22-22P	CONNECTOR	2
	1	MS3102A-36-9S	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

1014416	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL 28 Oct 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
AC INPUT PANEL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020046
SCALE 1/1
WT
SHEET 1 OF 1

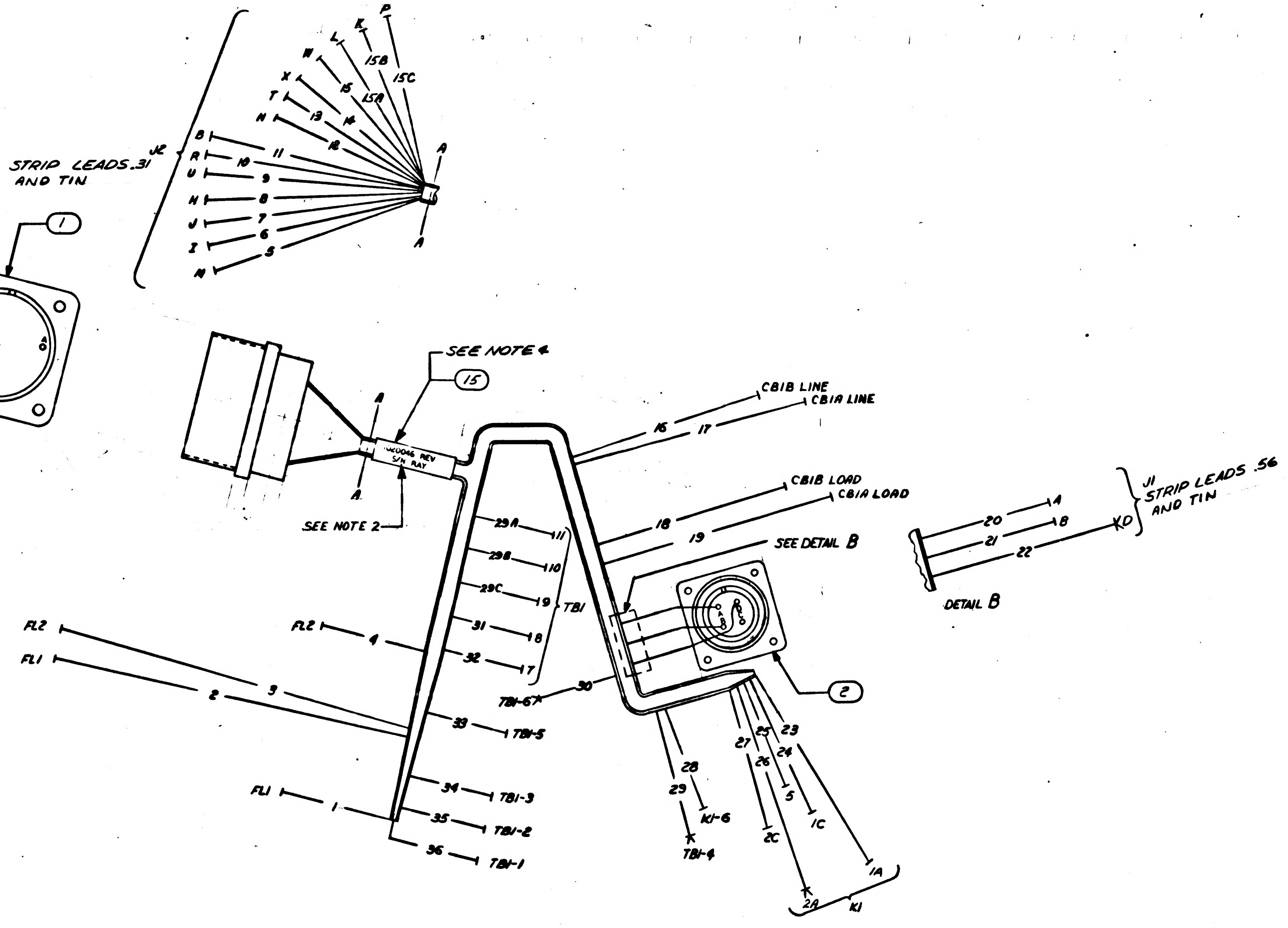
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020046 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	5	WHT/BLK/GY	18	3	36	ATTACH FIND NO. 10
ATTACH FIND NO. 10	35				6	SEE TWIST CHART
	15A				29C	ATTACH FIND NO. 10
ATTACH FIND NO. 10	33				9	
ATTACH FIND NO. 12	28				22	
ATTACH FIND NO. 12	25				11	SEE TWIST CHART
	22	WHT/BLK/GY	10	4	29	ATTACH FIND NO. 11
ATTACH FIND NO. 11	29	WHT/BLK/GY	12	5	8	SEE TWIST CHART
ATTACH FIND NO. 13	23	WHT/BRN/GY	12	6	19	ATTACH FIND NO. 14
ATTACH FIND NO. 14	17				4	ATTACH FIND NO. 14
ATTACH FIND NO. 14	3				20	
ATTACH FIND NO. 13	24				12	SEE TWIST CHART
ATTACH FIND NO. 11	30				13	SEE TWIST CHART
SEE TWIST CHART	14	WHT/BRN/GY	18	7	32	ATTACH FIND NO. 10
ATTACH FIND NO. 10	31				15	SEE TWIST CHART
ATTACH FIND NO. 11	30	WHT/RED/GY	12	8	27	ATTACH FIND NO. [illegible]
ATTACH FIND NO. 13	26				18	ATTACH FIND NO. 14
ATTACH FIND NO. 14	16				1	ATTACH FIND NO. 14
ATTACH FIND NO. 14	2				21	
ATTACH FIND NO. 12	26	WHT/RED/GY	18	9	10	
	15C	WHT/BLK/GY	18	3	29A	ATTACH FIND NO. 10
	15B	WHT/BLK/GY	18	3	29B	ATTACH FIND NO. 10
SEE TWIST CHART	7	WHT/BLK/GY	12	5	34	ATTACH FIND NO. 11



STRIP LEADS .31 AND TIN
J2
P
K
L
15B
15C
W
15
X
15A
T
13
14
H
12
A
B
11
R
10
U
9
N
8
J
7
I
6
M
5
1
SEE NOTE 4
15
A
A
SEE NOTE 2
CB1B LINE
CB1A LINE
CB1B LOAD
CB1A LOAD
16
17
18
19
SEE DETAIL B
J1
STRIP LEADS .56 AND TIN
20
21
22
A
B
D
DETAIL B
FL2
FL1
2
3
4
FL2
29A
29B
29C
31
32
33
11
10
19
18
17
TB1
TB1-6
30
TB1-5
34
TB1-3
35
TB1-2
36
TB1-1
FL1
1
2
28
29
27
26
25
24
23
5
K1-6
TB1-4
2C
1C
1A
2A
K1

TWIST CHART
5-36 WITH 31-15
35-6 WITH 19-32
7-34 WITH 30-13
29-8 WITH 24-12
26-10 WITH 25-11

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .08 HIGH CHARACTERS PER ND1002023
3. SOLDER PER MIL-S-6872
4. BOND FIND NO. 15 USING TETRAHYDROFURAN WITH 10% POLVINYL CHLORIDE
5. STRIP LEADS .25 & UNLESS OTHERWISE SPECIFIED DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 1/5/63

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1014368	SCHEMATIC	REF
1	1014472-2	BAND MARKER, CABLE	15
8	MS25036-12	LUG, TERMINAL	14
4	MS25036-56	LUG, TERMINAL	13
3	MS25036-44	LUG, TERMINAL	12
5	MS25036-11	LUG, TERMINAL	11
8	MS25036-2	LUG, TERMINAL	10
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 18, WHT/RED/GY	9
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 12, WHT/RED/GY	8
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 18, WHT/BRN/GY	7
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 12, WHT/BRN/GY	6
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 12, WHT/BLK/GY	5
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 10, WHT/BLK/GY	4
AR	ND1002181, TYPE I, CL I	WIRE, ELEC, AWG 18, WHT/BLK/GY	3
1	MS3102A-22-22P	CONNECTOR	2
1	MS3102A-36-9S	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014416	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible] 28 OCT 63
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible] 11-5-63
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 11/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
AC INPUT PANEL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO 1020046
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020046

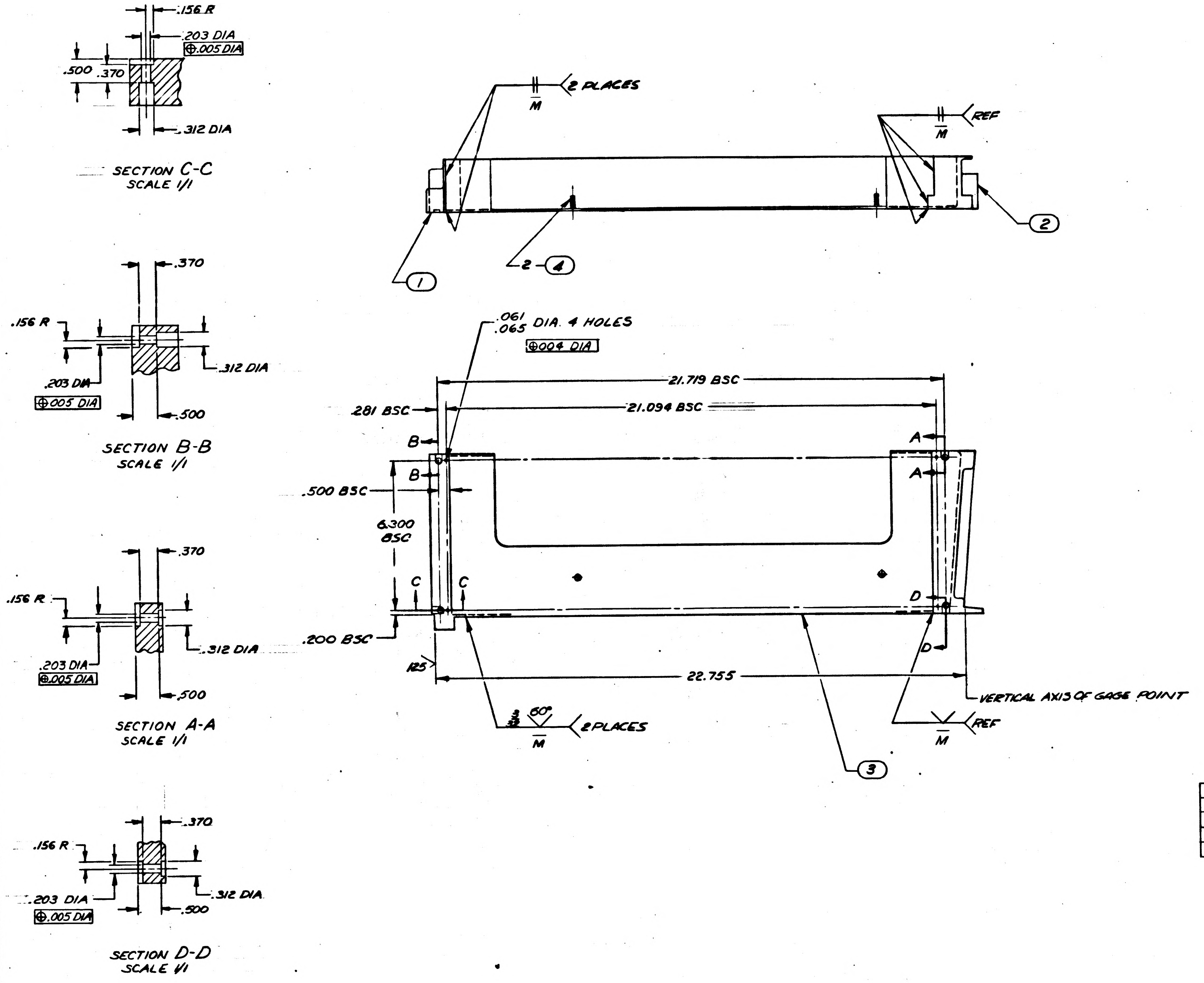
10120046

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
	CLASS B RELEASED PER TDRR 04138	10/[illegible]	


.156 R
.203 DIA
⊕.005 DIA
.500
.370
.312 DIA
SECTION C-C
SCALE 1/1
.370
.156 R
.203 DIA
⊕.005 DIA
.312 DIA
.500
SECTION B-B
SCALE 1/1
.370
.156 R
.203 DIA
⊕.005 DIA
.312 DIA
.500
SECTION A-A
SCALE 1/1
.370
.156 R
.203 DIA
⊕.005 DIA
.312 DIA
.500
SECTION D-D
SCALE 1/1
M
2 PLACES
M
REF
1
2
2-4
.061
.065 DIA. 4 HOLES
⊕.004 DIA
21.719 BSC
21.094 BSC
.281 BSC
B
B
A
A
.500 BSC
6.300 BSC
C
C
D
D
.200 BSC
.125
22.755
VERTICAL AXIS OF GAGE POINT
3/32
60°
M
2 PLACES
M
REF
3

NOTES:
1. WELD PER MIL-W-8604
2. REMOVE BURRS AND SHARP EDGES
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04138 DATE 10/[illegible]

—	—
SHEET 1	SHEET 2
REV STATUS OF SHEETS	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1006951-007	STUD, CAPTIVE	4
1	1020047-3	BRACKET, ANGLE, LEFT	3
1	1020047-2	PLATE, LEFT, FRONT	2
1	1020047-1	PLATE, LEFT, REAR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020053	1020054

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 9 SEPT 63
CHECKED [illegible] 17 SEPT 63
APPROVAL H. Morse JPK 19 OCT 63
APPROVAL [illegible] 10/14/63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY
(LEFT HAND)

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020047
SCALE 1/2
WT
SHEET 1 OF 2

1020047

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

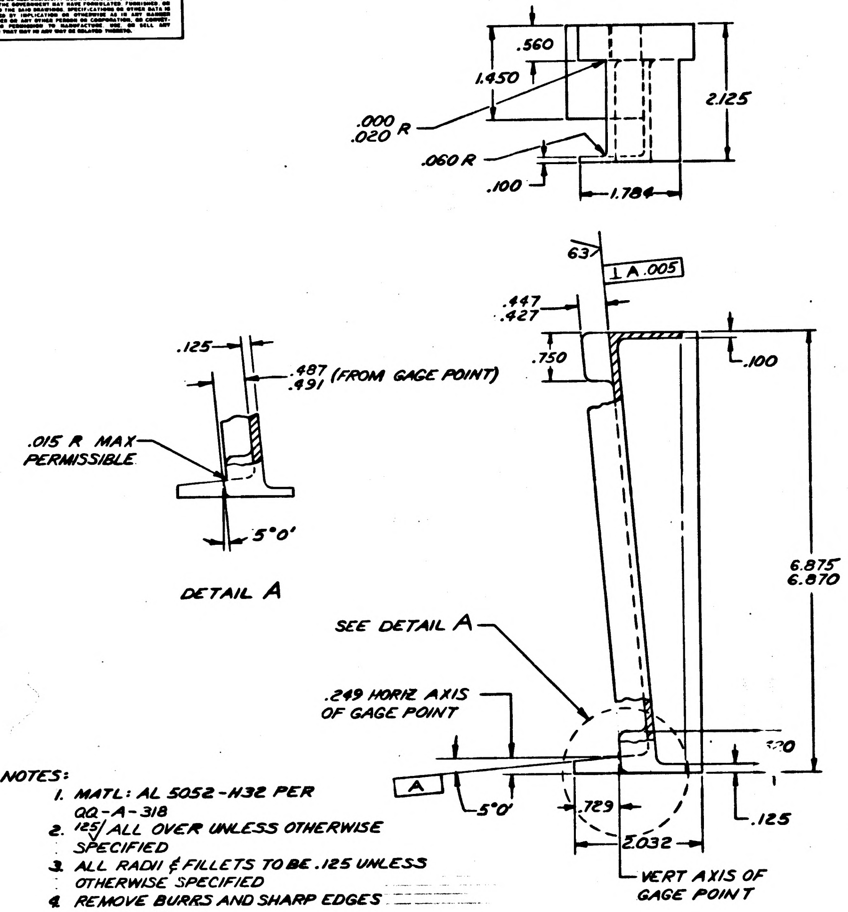
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

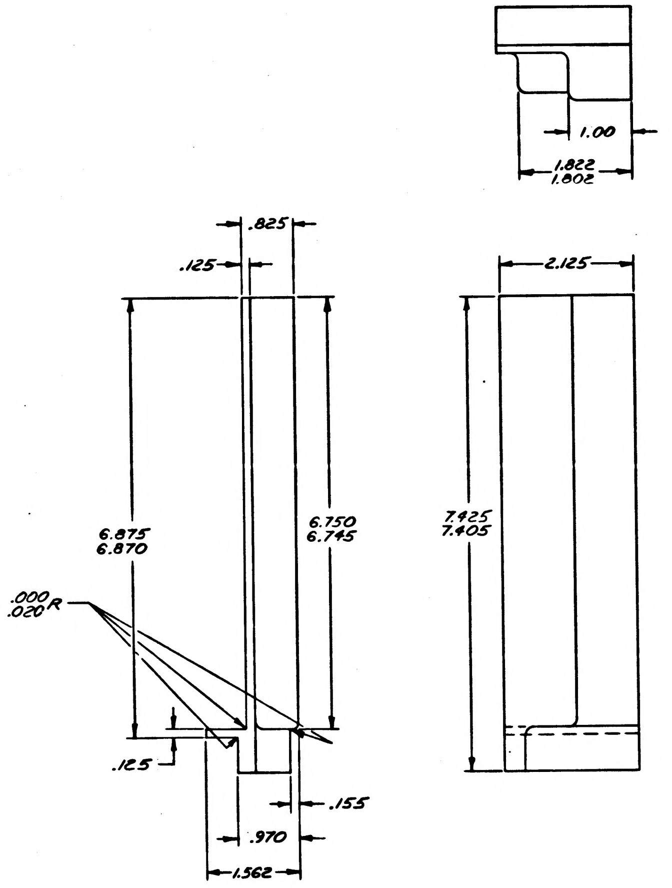
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED TDRR 04138	10/24/63	


.560
1.450
2.125
.000
.020 R
.060 R
.100
1.784
63
⊥ A .005
.447
.427
.750
.100
.125
.487
.491 (FROM GAGE POINT)
.015 R MAX PERMISSIBLE
5°0'
DETAIL A
SEE DETAIL A
6.875
6.870
.249 HORIZ AXIS OF GAGE POINT
A
5°0'
.729
.120
.125
2.032
VERT AXIS OF GAGE POINT

NOTES:
1. MATL: AL 5052-H32 PER QQ-A-318
2. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. ALL RADII & FILLETS TO BE .125 UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES
5. SCALE: 1/1

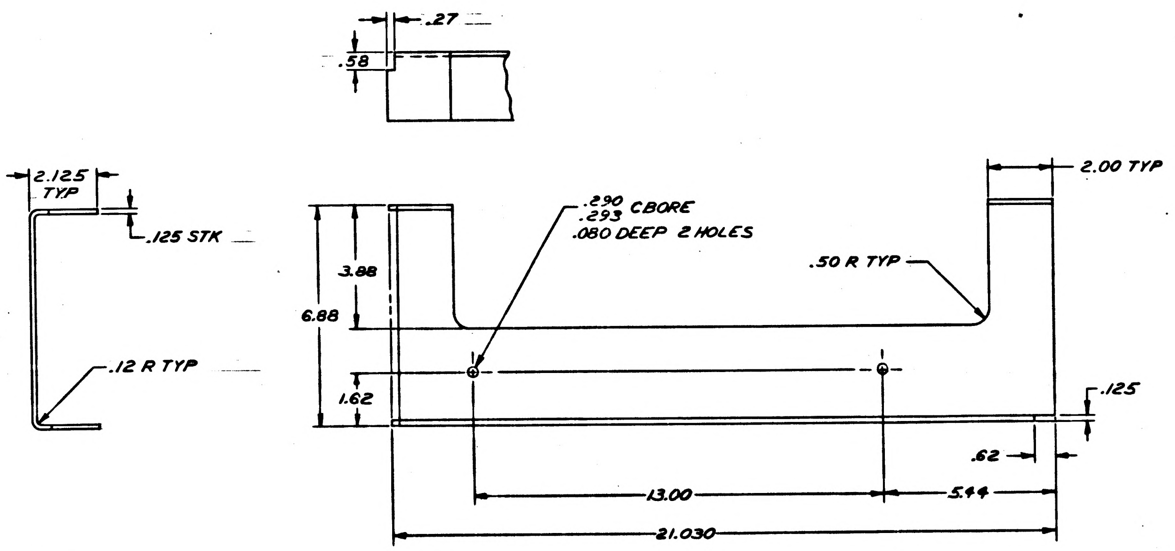
PLATE, LEFT, FRONT
1020047-2


1.00
1.822
1.802
.825
.125
2.125
6.875
6.870
6.750
6.745
7.425
7.405
.000
.020 R
.125
.155
.970
1.562

PLATE, LEFT, REAR
1020047-1

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. ALL RADII & FILLETS TO BE .125 UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES
5. SCALE: 1/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 10/24/63


.27
.58
2.125 TYP
.125 STK
.12 R TYP
.290
.293 CBORE
.080 DEEP 2 HOLES
.50 R TYP
2.00 TYP
3.88
6.88
1.62
.125
.62
13.00
5.44
21.030

NOTES:
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES
3. SCALE: 1/2

BRACKET, ANGLE, LEFT
1020047-3

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1020053	1020054
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.01 .005 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 6 Sept 63
CHECKED 13 Sept 63
APPROVAL H. Morse 14 Oct 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY
(LEFT HAND)

CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020047
SCALE NOTED WT SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020047

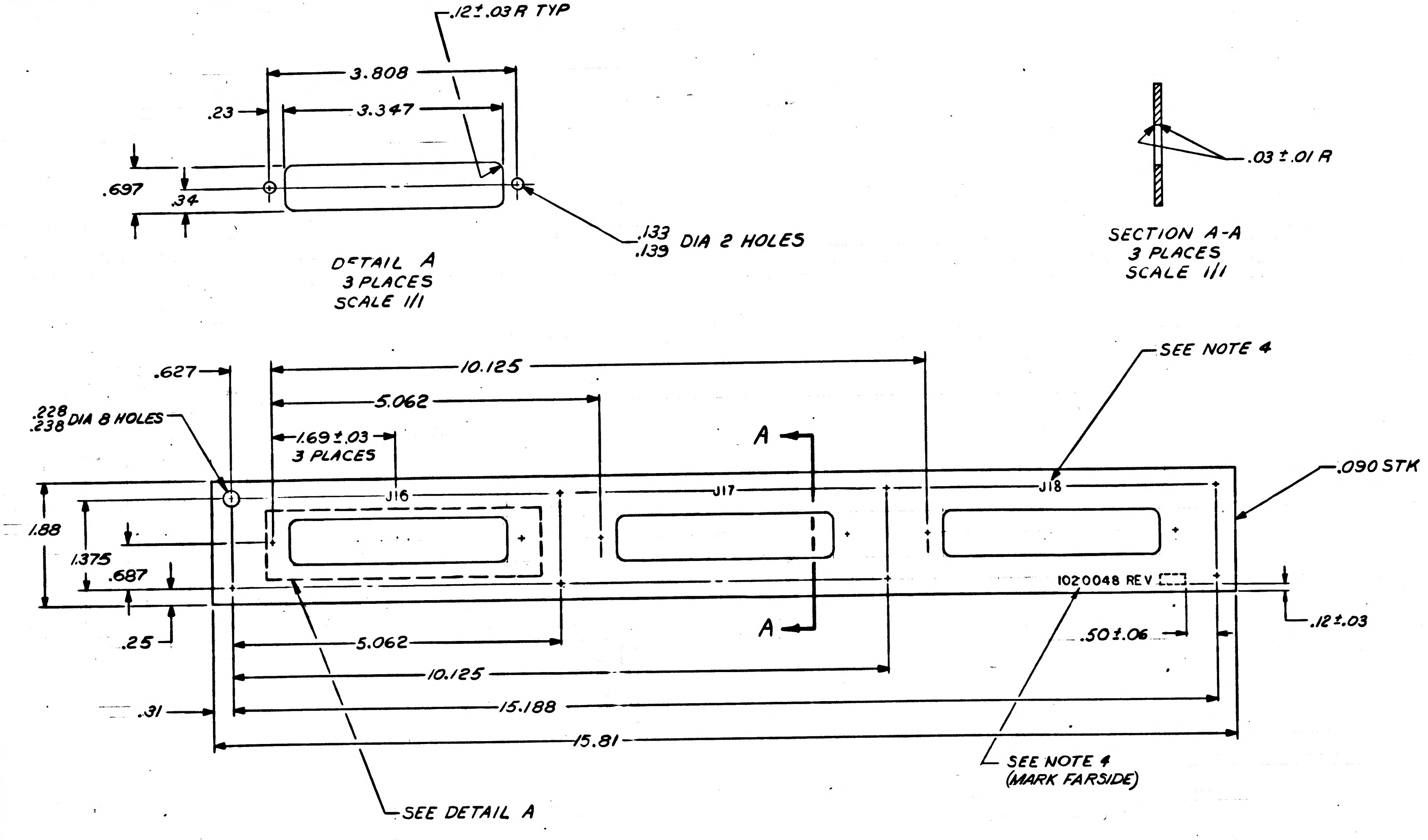
INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA
ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY
RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERN-
MENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER;
AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR
IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS
NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER
LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY-
ING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY
PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04135	[illegible]	[illegible]


.12±.03 R TYP
3.808
3.347
.23
.697
.34
.133
.139 DIA 2 HOLES
DETAIL A
3 PLACES
SCALE 1/1
.03±.01 R
SECTION A-A
3 PLACES
SCALE 1/1
SEE NOTE 4
10.125
5.062
.627
.228
.238 DIA 8 HOLES
1.69±.03
3 PLACES
A
J16
J17
J18
.090 STK
1.88
1.375
.687
1020048 REV
.12±.03
.25
A
.50±.06
5.062
10.125
.31
15.188
15.81
SEE NOTE 4
(MARK FARSIDE)
SEE DETAIL A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04135 DATE 4 Oct 63

NOTES:
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES
3. CHROMATE TREAT PER MIL-C-5541, EXCEPT ELECTRICALLY CONDUCTIVE
4. MARK .12 HIGH BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.016 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN A. Contant DATE 6 SEPT 63
CHECKED David Conley 27 SEPT 63
APPROVAL H Moore JPK 19 OCT 63
APPROVAL [illegible] 10/14/63
APPROVAL [illegible] 10/14/63
NASA APPROVAL [illegible] 10-12-63
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

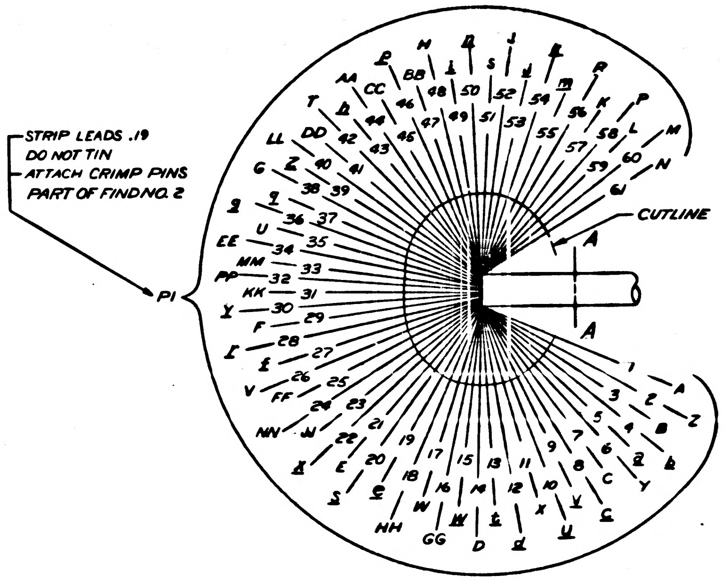
PLATE, CONNECTOR
JUNCTION BOX

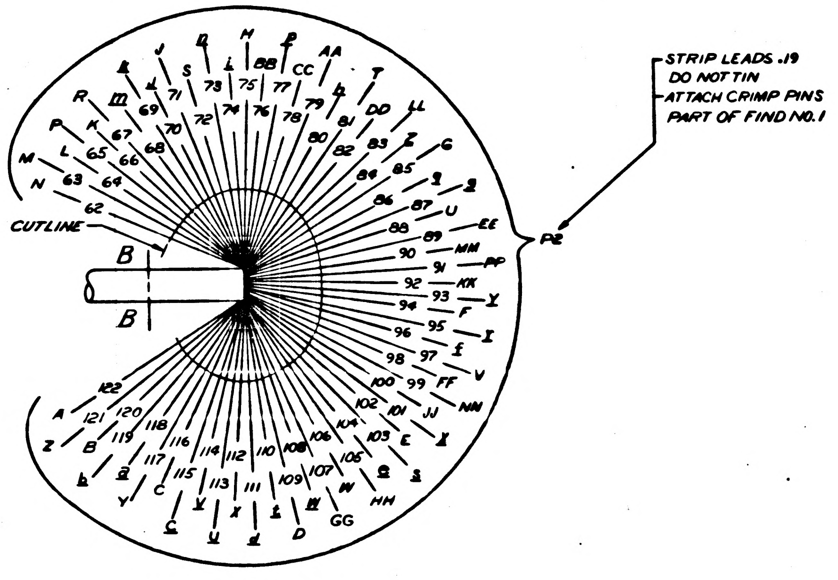
CODE IDENT NO. —— SIZE D NASA DRAWING NO. 1020048
SCALE 1/1 WT SHEET 1 OF 1

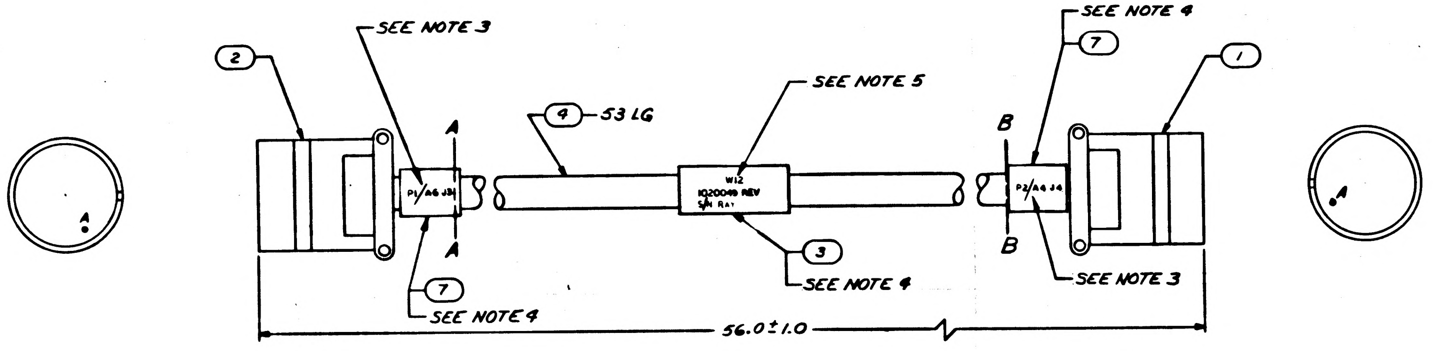
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR NO. 06767 DR CHK APPD	2	


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2
CUTLINE
P1
A
A


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1
CUTLINE
P2
B
B


2
SEE NOTE 3
4
53 LG
SEE NOTE 5
W12
1020049 REV
P1/A6J4
A
A
7
SEE NOTE 4
3
SEE NOTE 4
56.0±1.0
SEE NOTE 4
7
1
B
B
P2/A6J4
SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/15/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua, GRADE a CLASS I CATEGORY I FOR FIND NO. 4 AWG 5/8
3. MARK .08 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

A	—
SHEET 1	SHEET 2

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472 – 4A	BAND MARKER, CABLE	7
AR	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELEC	6
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELEC	5
AR	SEE NOTE 2	SLEEVING	4
1	1014472-4	BAND MARKER, CABLE	3
1	MS3126F-24-61SY	CONNECTOR	2
1	MS3126F-24-61PZ	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

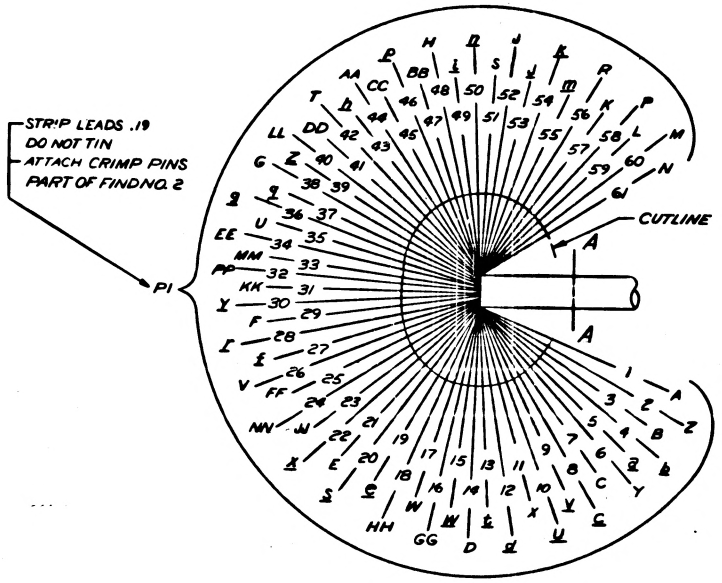
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN K. MATTY DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

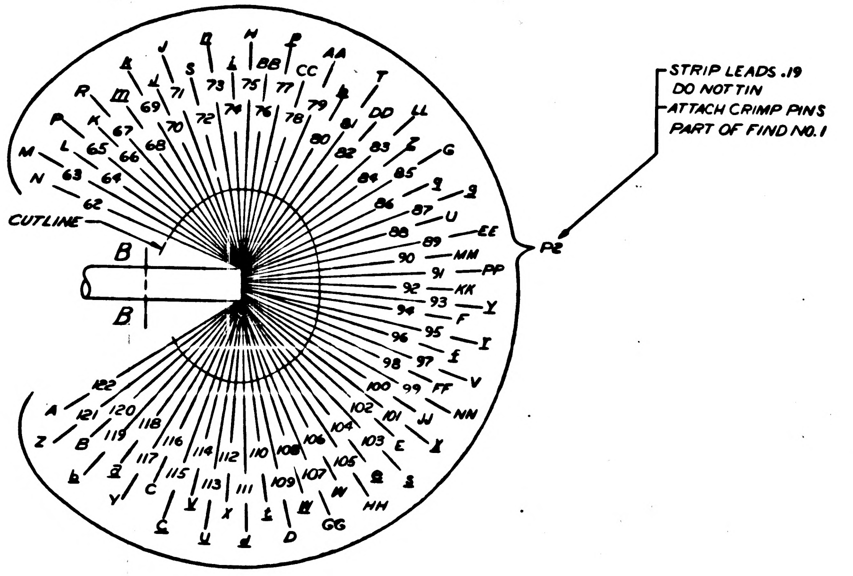
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

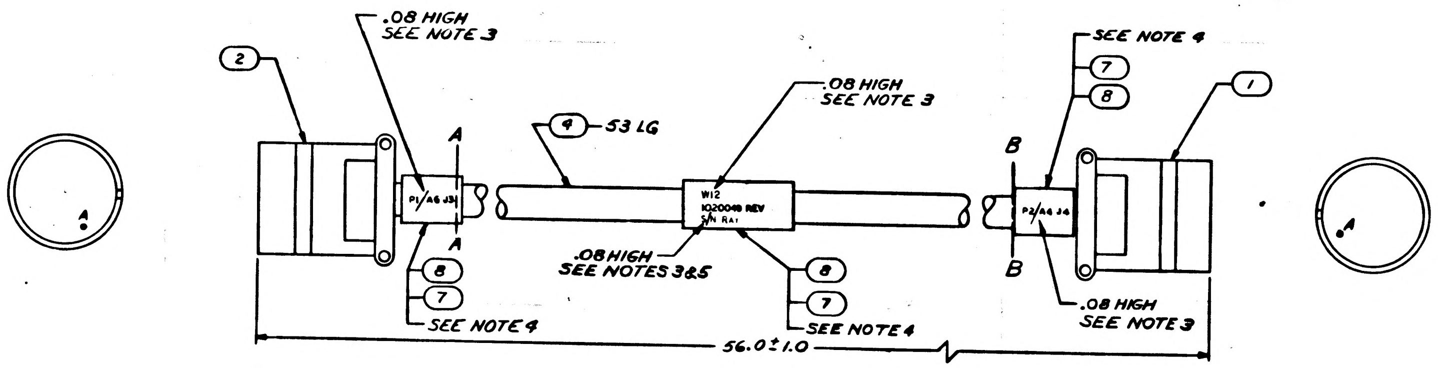
CABLE ASSY
W12
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020049
SCALE 1/1
SHEET 1 OF 2

SYM	DESCRIPTION	DATE	APPROVED
—	~~CLASS B RELEASED PER TDRR~~		
A	CHANGED PER TDRR NO.06767 DR CHK APPD	12 MAR 64	
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	28 MAY 65	


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2
P1
CUTLINE
A
A


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1
P2
CUTLINE
B
B


2
.08 HIGH
SEE NOTE 3
A
A
P1/A6 J3
4
53 LG
.08 HIGH
SEE NOTE 3
W12
1020049 REV
S/N
.08 HIGH
SEE NOTES 3&5
8
7
SEE NOTE 4
8
7
SEE NOTE 4
SEE NOTE 4
7
8
B
B
P2/A6 J4
1
.08 HIGH
SEE NOTE 3
56.0±1.0
A
A

NOTES

1. FOR FABRICATION, SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua, GRADE a CLASS I CATEGORY I FOR FIND NO. 4 AWG 5/8
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND 8 APPROX AS SHOWN
5. SERIALIZE PER ND1002023
6. CRIMP PER ND1002206

* DENOTES LENGTH IN FEET

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006253	ADHESIVE	8
3	1014472-4A	BAND MARKER, CABLE	7
* 275	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELEC	6
* 30	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELEC	5
* 5.0	SEE NOTE 2	SLEEVING	4
~~1~~	~~1014472-4~~	~~BAND MARKER, CABLE~~	~~3~~
1	MS3126F-24-61SY	CONNECTOR	2
1	MS3126F-24-61PZ	CONNECTOR	1

LIST OF MATERIALS

1014465	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN K. MATT DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSY
W12
OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020049
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

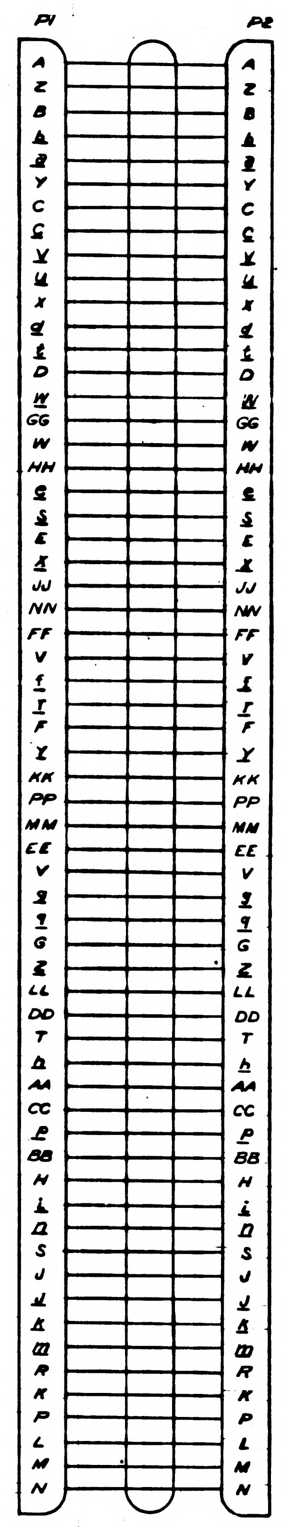
1020049 B

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	~~CL B RELEASED PER TDRF~~		
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHKD APPD	28 MAY 65	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	122	
	2				121	
	3				120	
	4				119	
	5				118	
	6	BLK		5	117	
	7	WHT		6	116	
	8				115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHT	22	6	62	

ELECTRICAL SCHEMATIC



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

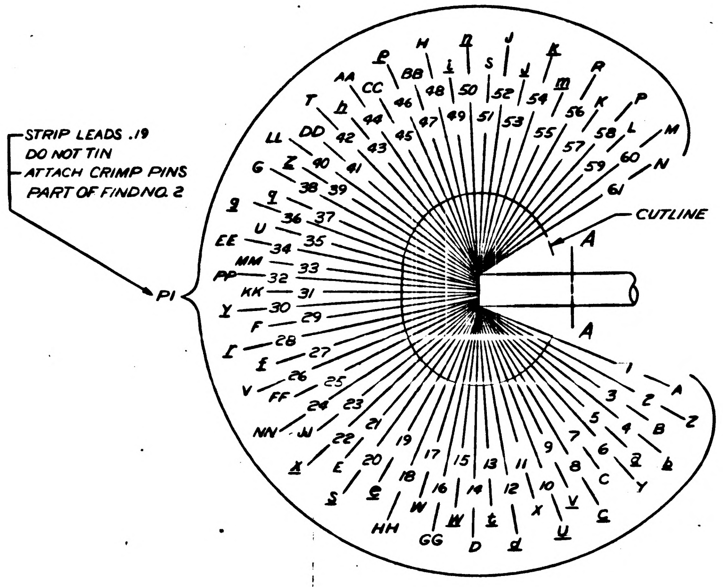
CABLE ASSY
W12
OPERATION CONSOLE

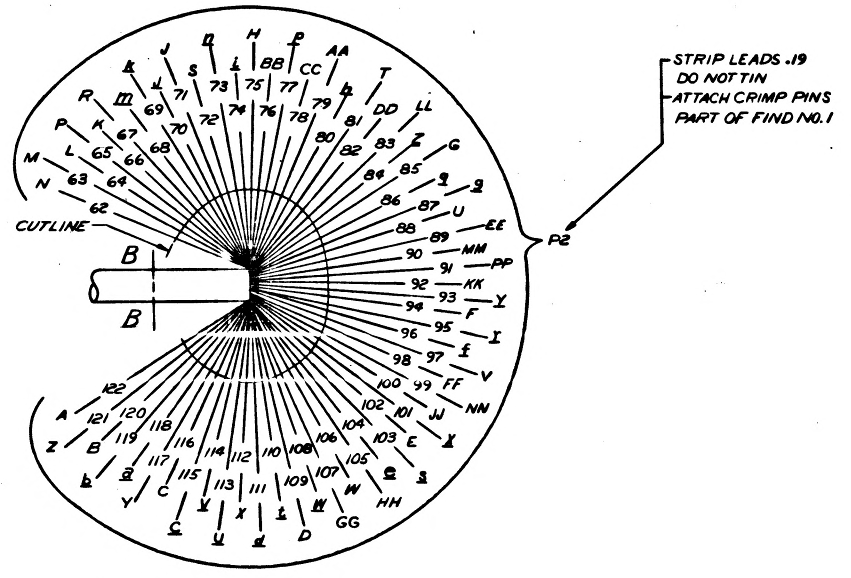
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020049
SCALE NONE
WT
SHEET 2 OF

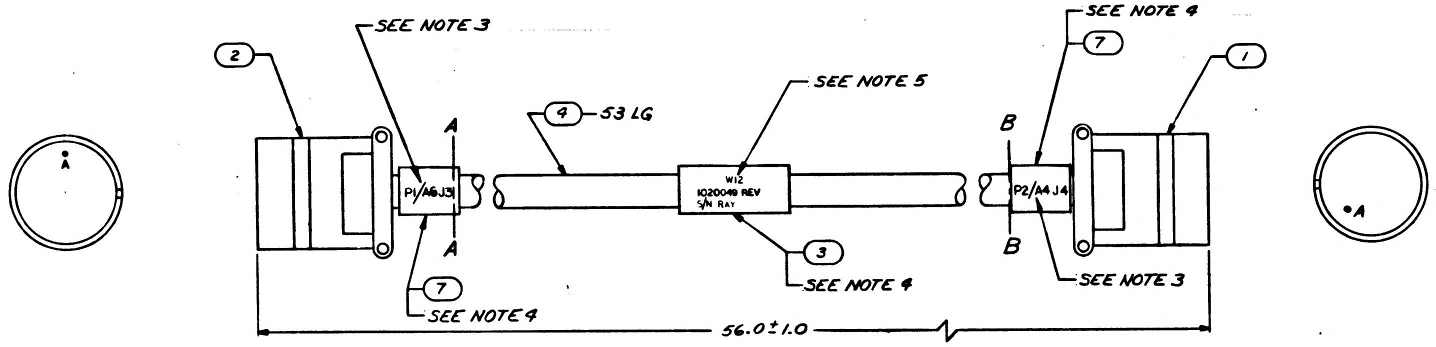
MASTER

1020049 B

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
—	CLASS B RELEASED PER TDRR		


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2
P1
CUTLINE
A
A


STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1
P2
CUTLINE
B
B


2
SEE NOTE 3
A
A
P1/A6J31
7
SEE NOTE 4
4
53 LG
SEE NOTE 5
W12
1020049 REV
S/N RAY
3
SEE NOTE 4
SEE NOTE 4
7
1
B
B
P2/A4 J4
SEE NOTE 3
56.0±1.0
A
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/17/63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE A CLASS I CATEGORY I FOR FIND NO. 4 AWG 5/8 COLOR WHT
3. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
4. BOND FIND NO. 3 & 7 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .08 HIGH BLACK CHARACTERS PER ND1002023

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1014472-3A	BAND MARKER, CABLE	7
AR	ND1002181 TYPE I CL I	WIRE ELEC, AWG 22 WHT	6
AR	ND1002181 TYPE I CL I	WIRE ELEC, AWG 22 BLK	5
AR	SEE NOTE 2	SLEEVING	4
1	1014472-3	BAND MARKER, CABLE	3
1	MS3126F-24-61SY	CONNECTOR	2
1	MS3126F-24-61PZ	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/ DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN K. MATTY DATE 9/63
CHECKED A Caggiano 20 Oct 63
APPROVAL H. [illegible] 28 OCT 63
APPROVAL [illegible] 28 OCT 63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 5 Nov 63
MIT APPROVAL [illegible] 11/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSY
W12
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020049
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

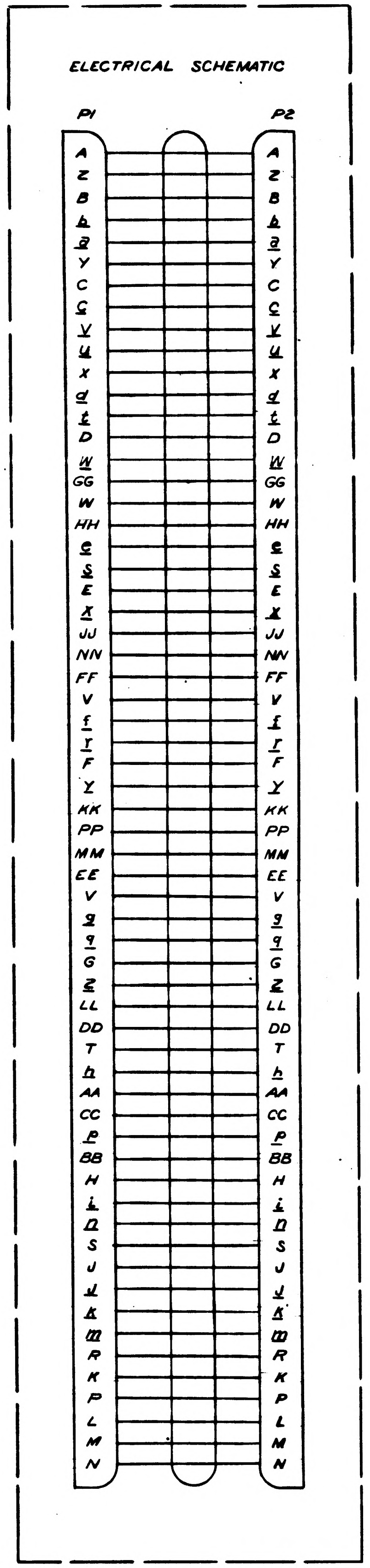
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	BLK	22	5	122	
	2	↕	↕	↕	121	
	3				120	
	4				119	
	5				118	
	6	BLK		5	117	
	7	WHT		6	116	
	8	↕		↕	115	
	9				114	
	10				113	
	11				112	
	12				111	
	13				110	
	14				109	
	15				108	
	16				107	
	17				106	
	18				105	
	19				104	
	20				103	
	21				102	
	22				101	
	23				100	
	24				99	
	25				98	
	26				97	
	27				96	
	28				95	
	29				94	
	30				93	
	31				92	
	32				91	
	33				90	
	34				89	
	35				88	
	36				87	
	37				86	
	38				85	
	39				84	
	40				83	
	41				82	
	42				81	
	43				80	
	44				79	
	45				78	
	46				77	
	47				76	
	48				75	
	49				74	
	50				73	
	51				72	
	52				71	
	53				70	
	54				69	
	55				68	
	56				67	
	57				66	
	58				65	
	59				64	
	60				63	
	61	WHT	22	6	62	

ELECTRICAL SCHEMATIC


P1
A
Z
B
b
a
Y
C
c
v
u
X
d
t
D
w
GG
W
HH
e
s
E
x
JJ
NN
FF
V
f
r
F
y
KK
PP
MM
EE
V
g
q
G
z
LL
DD
T
h
AA
CC
p
BB
H
i
n
S
J
j
k
m
R
K
P
L
M
N
P2
A
Z
B
b
a
Y
C
c
v
u
X
d
t
D
w
GG
W
HH
e
s
E
x
JJ
NN
FF
V
f
r
F
y
KK
PP
MM
EE
V
g
q
G
z
LL
DD
T
h
AA
CC
p
BB
H
i
n
S
J
j
k
m
R
K
P
L
M
N

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/15/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN K. MATTY DATE
CHECKED C. Caggiano 20 Oct 63
APPROVAL N. Morse 1 Nov 20 Oct 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

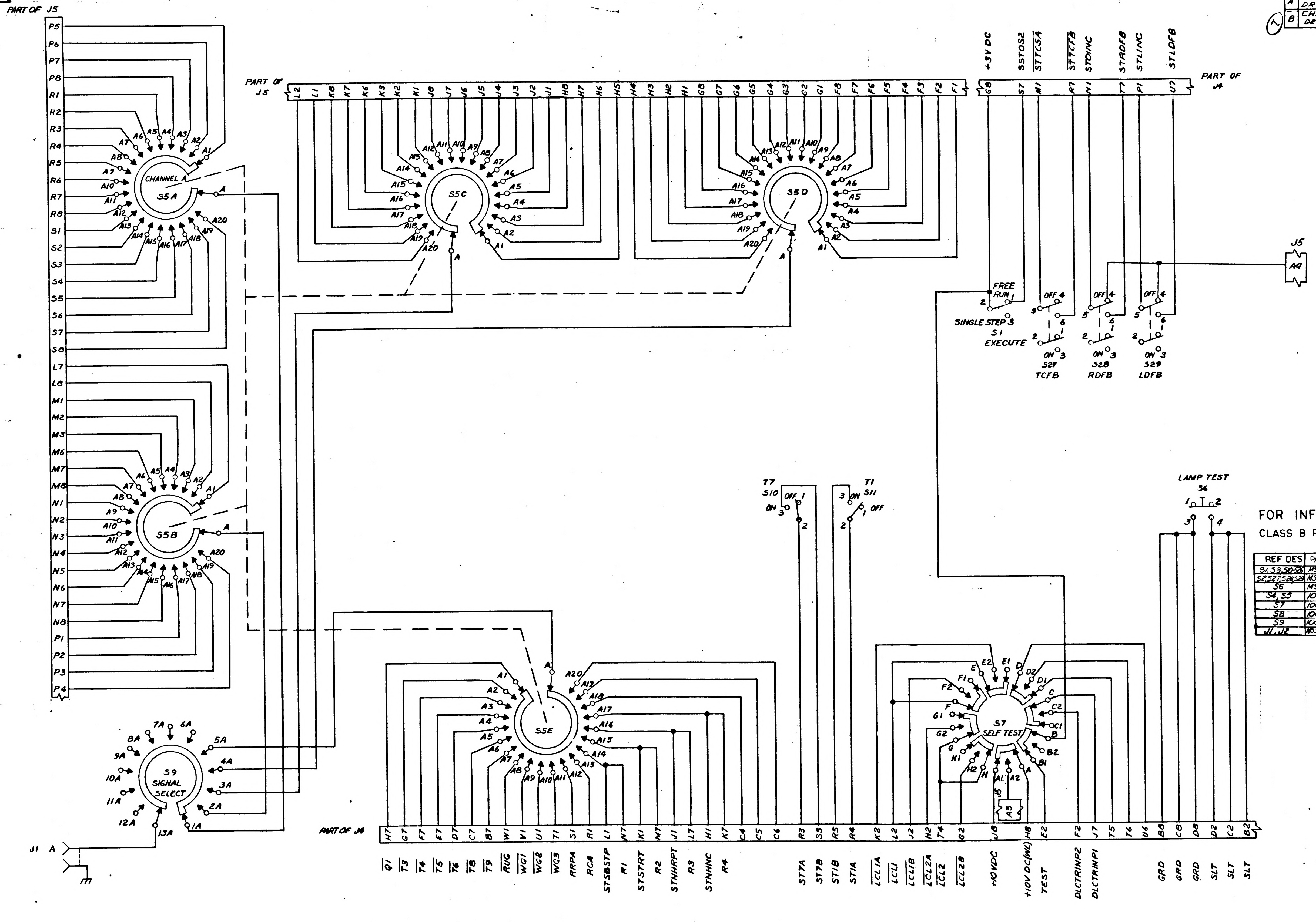
CABLE ASSY
W12
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020049
SCALE NONE
WT
SHEET 2 OF 2

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR		
A	CL II CHANGE PER RD R5673 DR FWP CHK APPD	1-9-64	
B	CHANGED PER TDRR 06327 DR K Matty CHK APPD	20FEB 64	


PART OF J5
P5 P6 P7 P8 R1 R2 R3 R4 R5 R6 R7 R8 S1 S2 S3 S4 S5 S6 S7 S8 L7 L8 M1 M2 M3 M6 M7 M8 N1 N2 N3 N4 N5 N6 N7 N8 P1 P2 P3 P4
CHANNEL
S5A
S5B
S5C
S5D
S5E
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20
PART OF J5
L2 L1 K8 K7 K6 K3 K2 K1 J8 J7 J6 J5 J4 J3 J2 J1 H8 H7 H6 H5 H4 H3 H2 H1 G8 G7 G6 G5 G4 G3 G2 G1 F8 F7 F6 F5 F4 F3 F2 F1
+3V DC
SSTOS2
STTCSA
STTCFB
STOINC
STRDFB
STLINC
STLDFB
G8 S7 M1 R7 N1 T7 P1 U7
PART OF J4
J5
A4
FREE RUN
SINGLE STEP
S1
EXECUTE
OFF
ON
S27
TCFB
S28
RDFB
S29
LDFB
S9
SIGNAL SELECT
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A
J1
A
T7
S10
OFF
ON
T1
S11
LAMP TEST
S6
S7
SELF TEST
E2 E1 D2 D1 C C2 C1 B B2 B1 A A2 A1 H H2 H1 G G2 G1 F F2 F1 E
A3
PART OF J4
H7 G7 F7 E7 D7 C7 B7 W1 V1 U1 T1 S1 R1 L1 N7 K1 M7 J1 L7 H1 K7 C4 C5 C6 R3 S3 R5 R4 K2 L2 J2 H2 T4 G2 J8 H8 E2 F2 J7 T5 T6 U6 B8 C8 D8 D2 C2 B2
Q1 T3 T4 T5 T6 T8 T9 RUG WG1 WG2 WG3 RRPA RCA STSBSTP R1 STSTRT R2 STNHRPT R3 STNHNC R4
ST7A ST7B ST1B ST1A LCL1A LCL1 LCL1B LCL2A LCL2 LCL2B
+10VDC
+10V DC(WL)
TEST
DLCTRINP2
DLCTRINP1
GRD GRD GRD SLT SLT SLT

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04306 DATE 10/30/63

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
S1, S3, S10-S26	MS24655-23	SWITCH, TGL			
S2, S27, S28, S29	MS24656-23	SWITCH, TGL			
S6	MS25089-3C	SWITCH, PUSH			
S4, S5	1006892-2	SWITCH, ROT.			
S7	1006886-2				
S8	1005953-4				
S9	1006953-5	SWITCH, ROT.			
J1, J2	MS3117910-94A	CONN, RECP			

B	B
A	A
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014380	1014156
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN C. Hayward DATE 9SEPT63
CHECKED A. Coggiano 20 Sep 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL 10-29-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

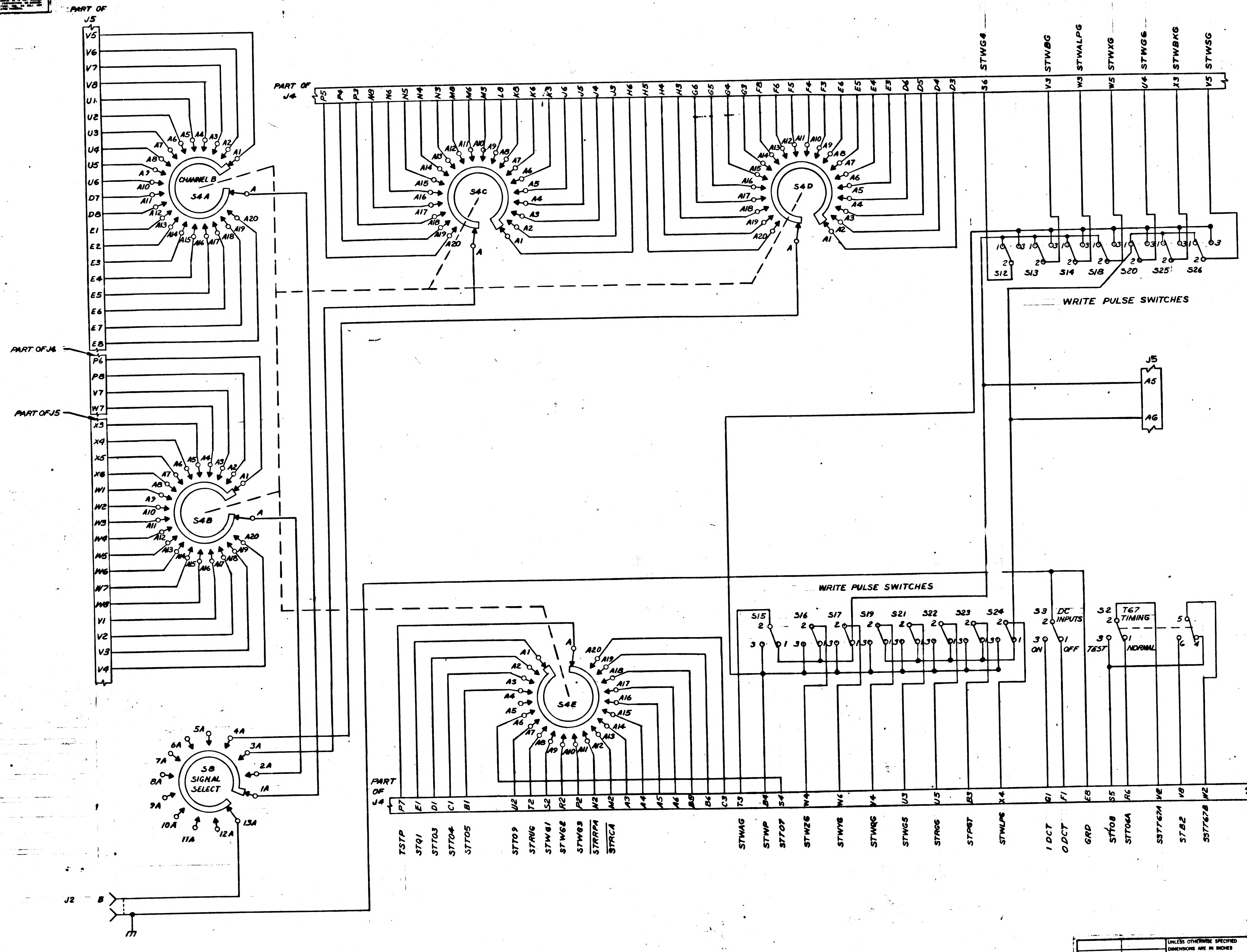
ELECTRICAL SCHEMATIC
FRONT PANEL SELF TEST
COMPUTER TEST SET

CODE IDENT NO. — SIZE J NASA DRAWING NO 1020050
SCALE NONE WT SHEET 1 OF 2

1020050

PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CL II CHANGE PER RD R 5678 DR FWP CHK APPD.	1-8-64	
B	CHANGED PER TDRR 06327 DR H Mott CHK A. Cozzi APPD	20 FEB 64	3 16 64


PART OF J5
V5 V6 V7 V8 U1 U2 U3 U4 U5 U6 D7 D8 E1 E2 E3 E4 E5 E6 E7 E8
CHANNEL B
S4A
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A
PART OF J4
P6 P8 V7 W7
PART OF J5
X5 X4 X5 X6 W1 W2 W3 W4 W5 W6 W7 W8 V1 V2 V3 V4
S4B
PART OF J4
P5 P4 P3 N9 N6 N5 N4 N3 M8 M6 M5 L8 K8 K6 K3 J6 J5 J4 J3 H6 H5 H4 H3 G6 G5 G4 F8 F6 F5 F4 F3 E6 E5 E4 E3 D6 D5 D4 D3 S6 V3 W3 W5 U4 X3 V5
STWG4 STWBG STWALPG STWXG STWGG STWBKG STWSG
S4C
S4D
S12 S13 S14 S18 S20 S25 S26
WRITE PULSE SWITCHES
J5
A5
A6
S8
SIGNAL SELECT
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A
S4E
WRITE PULSE SWITCHES
S15 S16 S17 S19 S21 S22 S23 S24
S3 DC INPUTS ON OFF
S2 T67 TIMING TEST NORMAL
PART OF J4
P7 E1 D1 C1 B1 U2 T2 S2 R2 P2 N2 A2 A3 A4 A5 A6 B5 B6 C3 T3 B4 S4 W4 W6 V4 U3 U5 B3 X4 G1 F1 E8 S5 R6 V2 V8 W2
TSTP STQ1 STTO3 STTO4 STTO5 STTO9 STRIG STWG1 STWG2 STWG3 STRRPA STRCA STWAG STWP STWZG STWYG STWQG STWGS STRGS STPGT STWLPG 1 DCT 0 DCT GRD STTO8 STTOGA SSTTG7A STB2 SSTTG7B
J2 B

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 06306 DATE 10/30/63

MASTER

1014380	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO.
LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN C Hagerman DATE 9-25-63
CHECKED A Cozzi 30 Sep 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

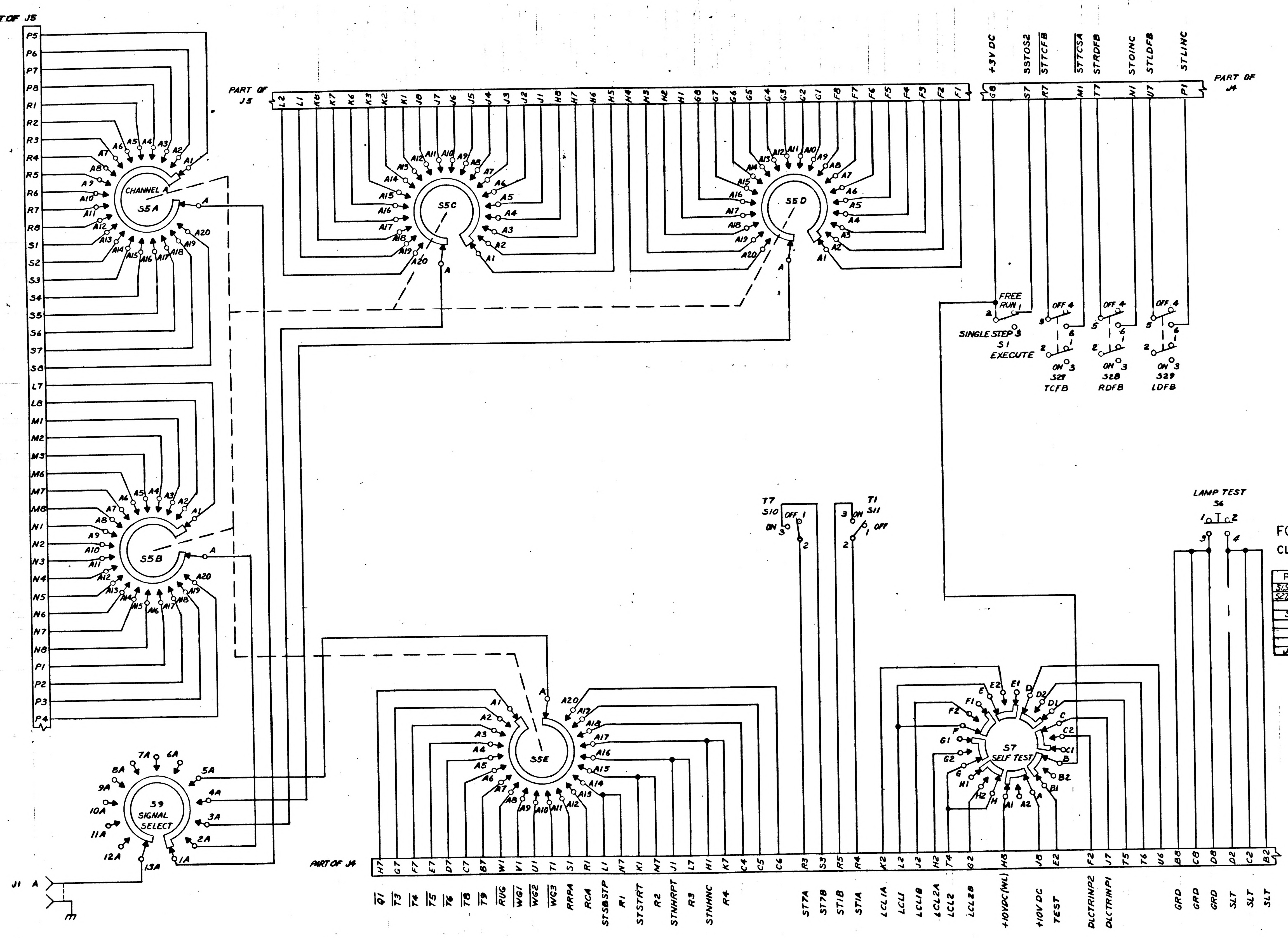
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
FRONT PANEL SELF TEST
COMPUTER TEST SET

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020050
SCALE NONE WT SHEET 2 OF 2

1020050

SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR		


PART OF J5
P5
P6
P7
P8
R1
R2
R3
R4
R5
R6
R7
R8
S1
S2
S3
S4
S5
S6
S7
S8
L7
L8
M1
M2
M3
M6
M7
M8
N1
N2
N3
N4
N5
N6
N7
N8
P1
P2
P3
P4
CHANNEL A
S5A
S5B
S5C
S5D
S5E
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
A20
A
PART OF J5
L2
L1
K8
K7
K6
K3
K2
K1
J8
J7
J6
J5
J4
J3
J2
J1
H8
H7
H6
H5
H4
H3
H2
H1
G8
G7
G6
G5
G4
G3
G2
G1
F8
F7
F6
F5
F4
F3
F2
F1
+3V DC
SSTOS2
STTCFB
STTCSA
STRDFB
STOINC
STLDFB
STLINC
PART OF J4
G8
S7
R7
M1
T7
N1
U7
P1
FREE RUN
SINGLE STEP
S1
EXECUTE
OFF
ON
S27
TCFB
S28
RDFB
S29
LDFB
T7
S10
OFF
ON
T1
S11
LAMP TEST
S6
S9
SIGNAL SELECT
1A
2A
3A
4A
5A
6A
7A
8A
9A
10A
11A
12A
13A
J1
S7
SELF TEST
PART OF J4
H7
G7
F7
E7
D7
C7
B7
W1
V1
U1
T1
S1
R1
L1
N7
K1
M7
J1
L7
H1
K7
C4
C5
C6
R3
S3
R5
R4
K2
L2
J2
H2
T4
G2
H8
J8
E2
F2
J7
T5
T6
U6
B8
C8
D8
D2
C2
B2
Q1
T3
T4
T5
T6
T8
T9
RUG
WG1
WG2
WG3
RRPA
RCA
STSBSTP
R1
STSTRT
R2
STNHRPT
R3
STNHNC
R4
ST7A
ST7B
ST1B
ST1A
LCL1A
LCL1
LCL1B
LCL2A
LCL2
LCL2B
+10VDC(WL)
+10V DC
TEST
DLCTRINP2
DLCTRINP1
GRD
GRD
GRD
SLT
SLT
SLT

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04306 DATE 10/30/63

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
S1,S2,S3,S10-S26	MS24655-23	SWITCH, TGL			
S27,S28,S29	MS24656-23	SWITCH, TGL			
S6	MS25089-3C	SWITCH, PUSH			
S4, S5	1006892-2	SWITCH, ROT.			
S7	1006886-2				
S8	1006953-4				
S9	1006953-5	SWITCH, ROT.			
J1, J2	MS3117[illegible]	CONN, RECP			

SHEET 1	SHEET 2
—	—

REVISION STATUS OF SHEETS

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014380	1014156
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

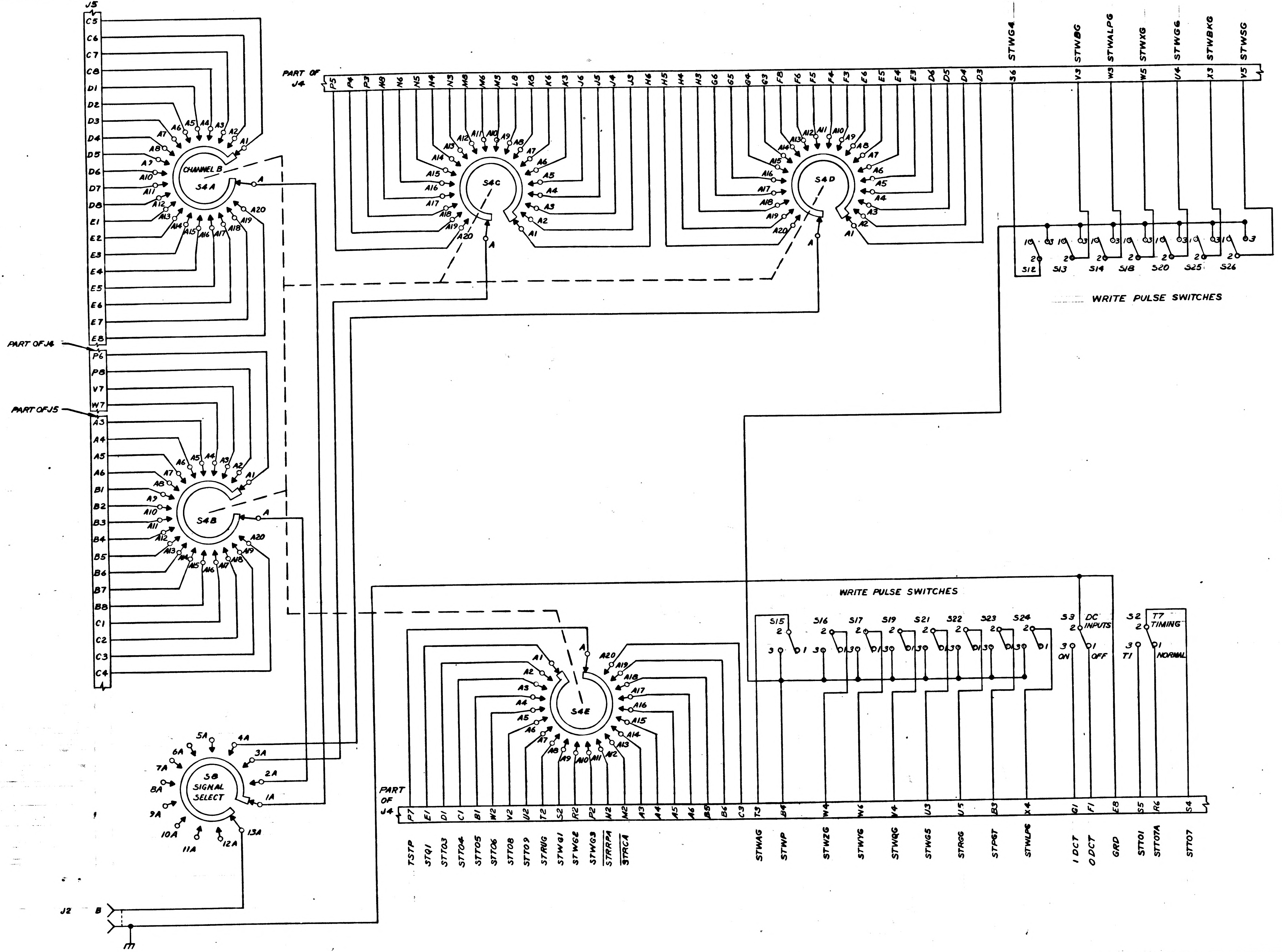
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN C Haywood DATE 9 SEPT 63
CHECKED A. Cazzaniga 30 Sep 63
APPROVAL
APPROVAL C. Sarkis Jr.
APPROVAL
NASA APPROVAL
MIT APPROVAL 3 Oct 63
MIT APPROVAL 10-29-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
FRONT PANEL SELF TEST
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020050
SCALE NONE
WT
SHEET 1 OF 2

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF J5
C5 C6 C7 C8 D1 D2 D3 D4 D5 D6 D7 D8 E1 E2 E3 E4 E5 E6 E7 E8
PART OF J4
P6 P8 V7 W7
PART OF J5
A3 A4 A5 A6 B1 B2 B3 B4 B5 B6 B7 B8 C1 C2 C3 C4
CHANNEL B
S4A
S4B
S4C
S4D
S4E
A A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20
PART OF J4
P5 P4 P3 N9 N6 N5 N4 N3 M8 M6 M5 L8 K8 K6 K3 J6 J5 J4 J3 H6 H5 H4 H3 G6 G5 G4 G3 F8 F6 F5 F4 F3 E6 E5 E4 E3 D6 D5 D4 D3 S6 V3 W3 W5 U4 X3 Y5
STWG4 STWBG STWALPG STWXG STWG6 STWBKG STWSG
S12 S13 S14 S18 S20 S25 S26
WRITE PULSE SWITCHES
WRITE PULSE SWITCHES
S15 S16 S17 S19 S21 S22 S23 S24
S3 DC INPUTS ON OFF
S2 T7 TIMING T1 NORMAL
1 2 3
S8 SIGNAL SELECT
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A
J2 B
PART OF J4
P7 E1 D1 C1 B1 W2 V2 U2 T2 S2 R2 P2 N2 M2 A3 A4 A5 A6 B5 B6 C3 T3 B4 W4 W6 Y4 U3 U5 B3 X4 G1 F1 E8 S5 R6 S4
TSTP STQ1 STTO3 STTO4 STTO5 STTO6 STTO8 STTO9 STRUG STWG1 STWG2 STWG3 STRRPA STRCA STWAG STWP STW2G STWYG STWQG STWG5 STRGG STPGT STWLPE IDCT ODCT GRD STTO1 STTOTA STTO7

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 01306 DATE 10/30/63

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014380	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN C Hagemand DATE 9 SEP 63
CHECKED A Coppins 30 Sep 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
FRONT PANEL SELF TEST
COMPUTER TEST SET

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020050
SCALE NONE WT SHEET 2 OF 2

1020050

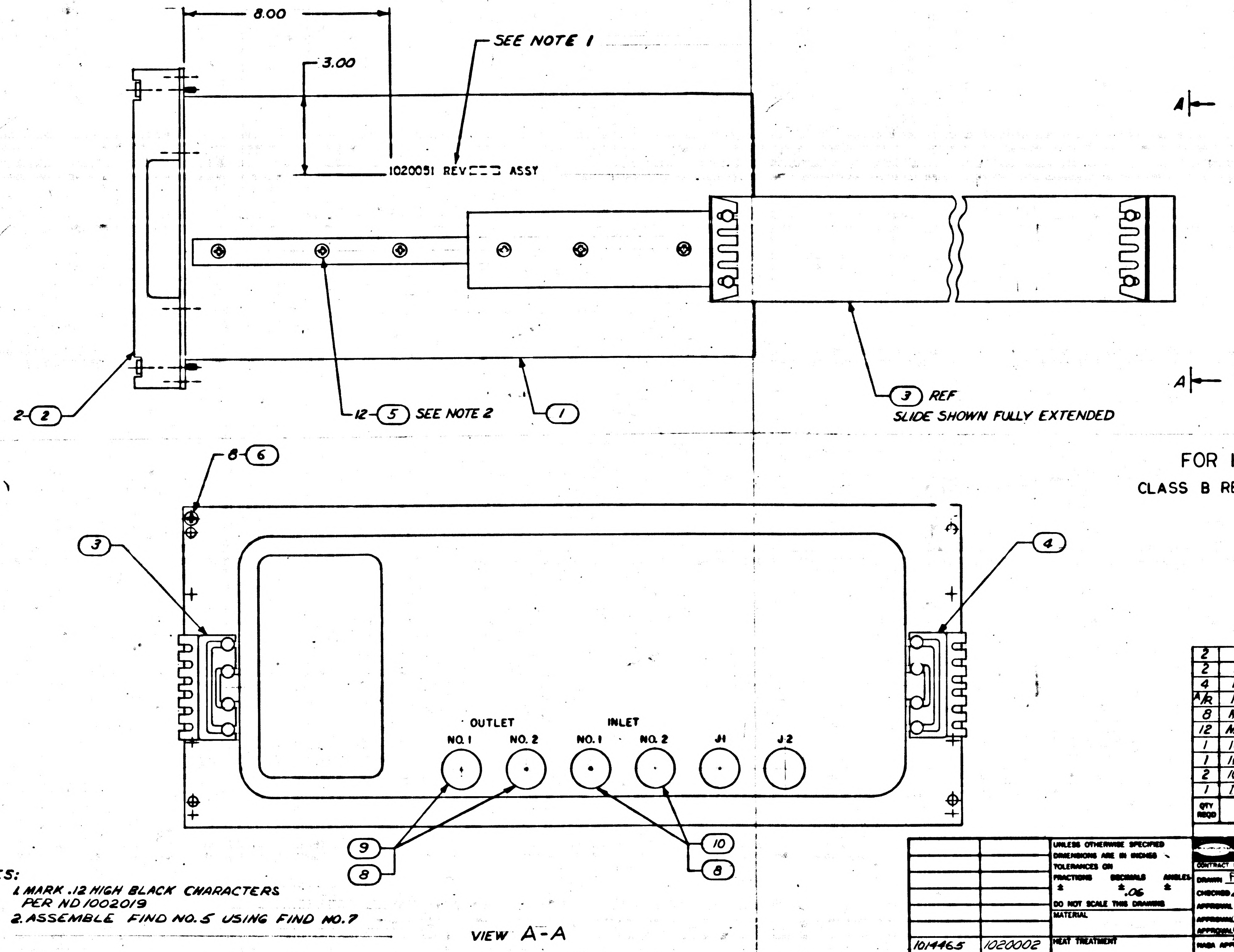
INCHES
PHOTOGRAPHIC SCALE ONLY

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 03526		
A	CHANGED PER TDRR 10303 DR CHK APPD	23 JUN 64	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR 03526 DATE 10/1/63

NOTES:
1. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
2. ASSEMBLE FIND NO. 5 USING FIND NO. 7

1020051

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1000135	COUPLING HALF, MALE	10
2	1006659-1	COUPLING HALF, FEMALE	9
4	MS 28778-4	PACKING, PREFORMED	8
A/R	MIL-S-40083 CL 31	COMPOUND, SEALING	7
8	MS35200-42	SCREW, FLAT HEAD	6
12	MS24693-C99	SCREW, FLAT HEAD	5
1	1006664-1	SLIDE, CHASSIS, LOCK OPEN (RH)	4
1	1006664-2	SLIDE, CHASSIS, LOCK OPEN (LH)	3
2	1014215-6	HANDLE ASSY	2
1	1006853	COOLING UNIT, MECH PANEL TYPE	1

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±
DECIMALS ±.06
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN FWho han DATE 10 Sep 63
CHECKED 12 Sep 63
APPROVAL H. Mikal 16 Sep 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 10/1/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COOLING UNIT ASSEMBLY

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020051
SCALE 1/2
WT
SHEET 1 OF 1

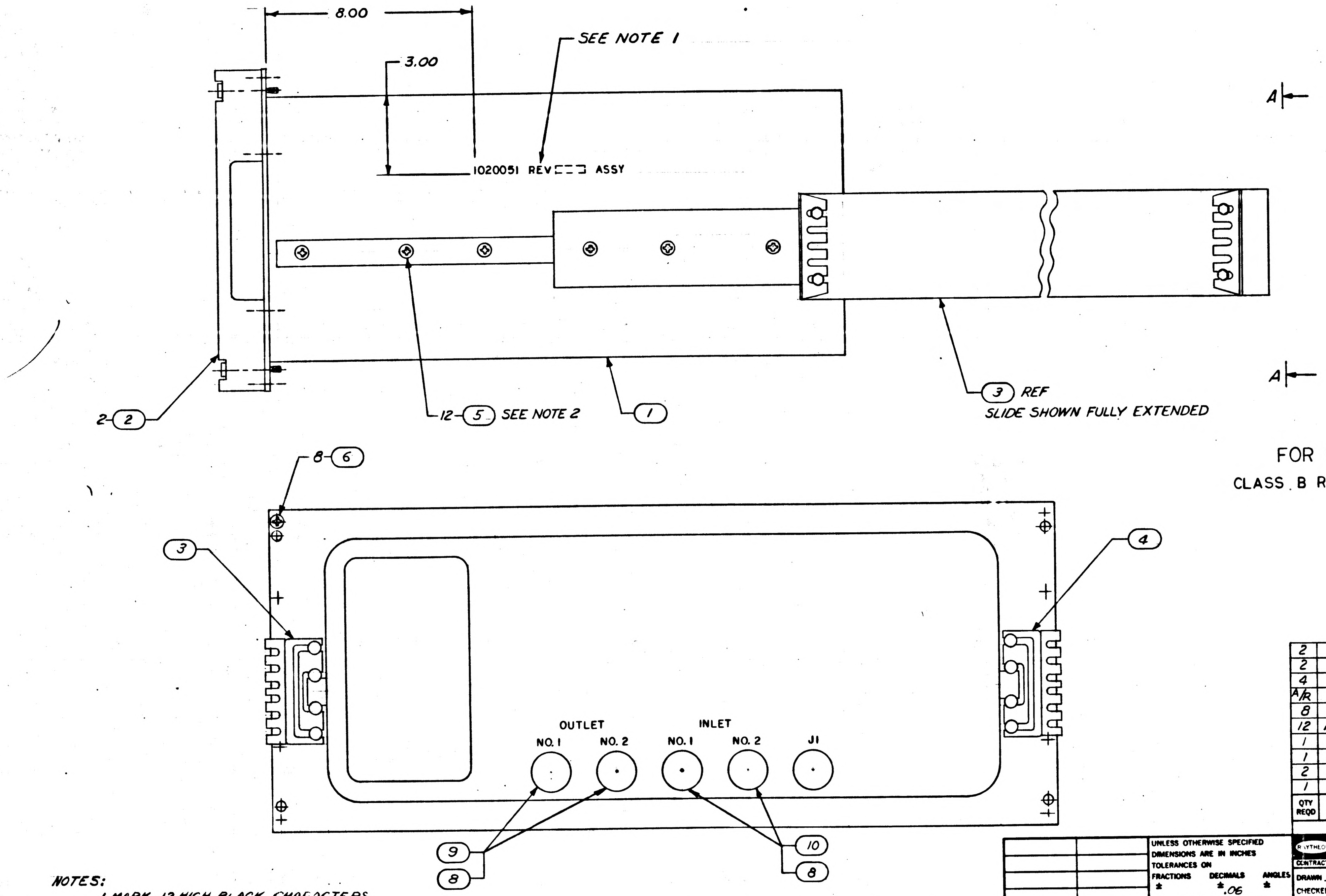
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 035P6		



VIEW A-A

NOTES:
1. MARK .12 HIGH BLACK CHARACTERS PER ND 1002019
2. ASSEMBLE FIND NO. 5 USING FIND NO. 7

FOR INFORMATION ONLY
CLASS B RELEASE TDRR 035P6 DATE 10/1/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1000135	COUPLING HALF, MALE	10
2	1006659-1	COUPLING HALF, FEMALE	9
4	MS 28778-4	PACKING, PREFORMED	8
A/R	MIL-S-40083 CL 31	COMPOUND, SEALING	7
8	MS35200-43	SCREW, FLAT HEAD	6
12	MS24693-C99	SCREW, FLAT HEAD	5
1	1006664-1	SLIDE, CHASSIS, LOCK OPEN (RH)	4
1	1006664-2	SLIDE, CHASSIS, LOCK OPEN (LH)	3
2	1014215-6	HANDLE ASSY	2
1	1006853	COOLING UNIT, MECH PANEL TYPE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN FLV[illegible] DATE 10 Sep 63
CHECKED [illegible] 12 Sep 63
APPROVAL H [illegible] 16 SEP 63
APPROVAL [illegible] 9-20-63
APPROVAL [illegible] 9/20/63
NASA APPROVAL [illegible] 10-3-63
MIT APPROVAL [illegible] 30 Sep 63
MIT APPROVAL [illegible] 10/1/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COOLING UNIT ASSEMBLY

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020051
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

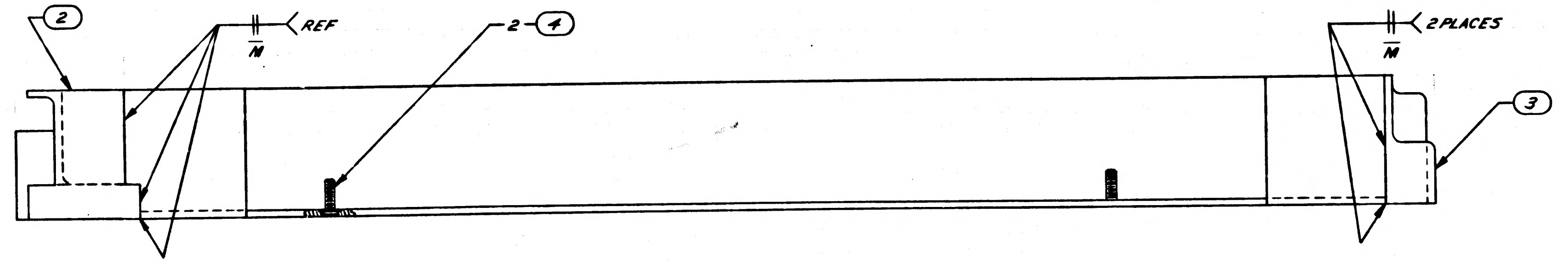
1020051

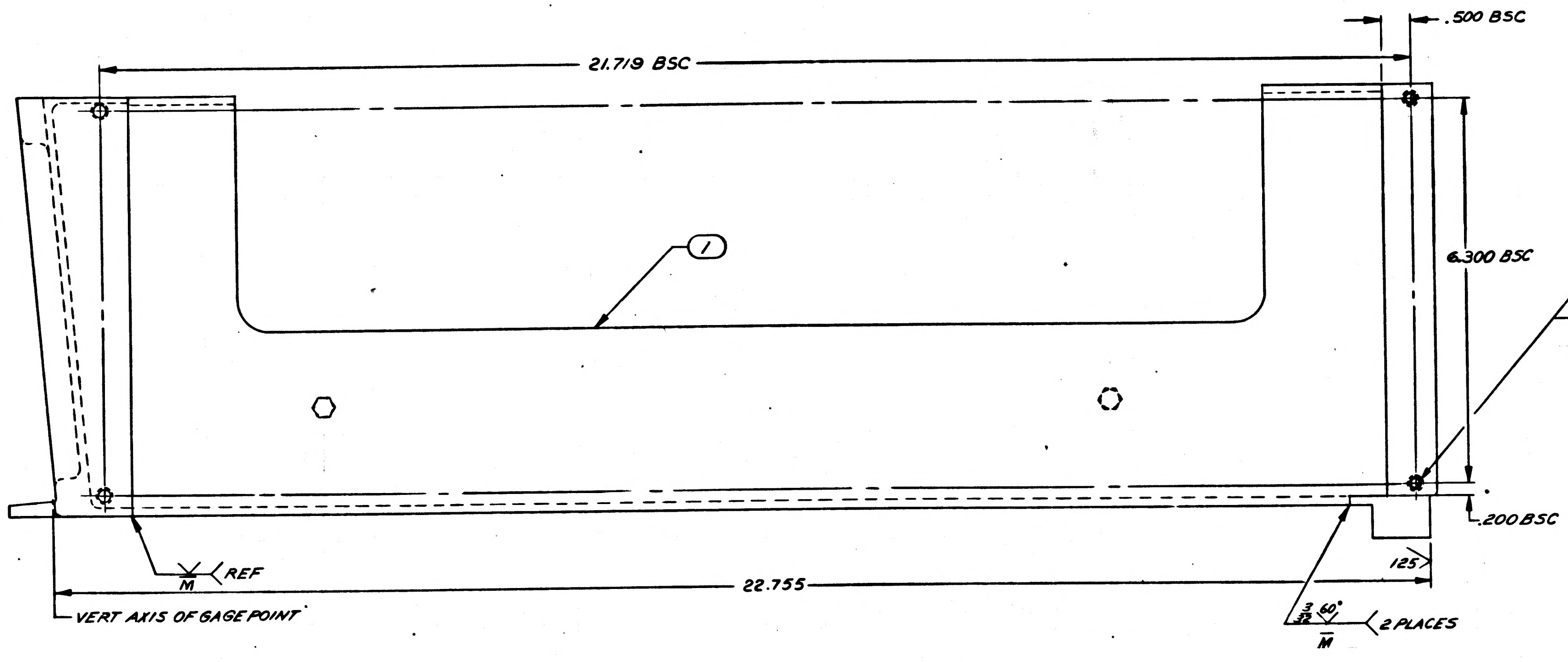
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04138	[illegible]	





.212/.216 DIA — .450/.470 DEEP AND CSK .250/.260 DIA — .030/.040 DEEP
TAP .250-20 UNC-2B — .310 MIN DEPTH FULL THREAD
4 HOLES ⊕ .002 DIA

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 10/24/63

NOTES
1. WELD PER MIL-W-8604
2. REMOVE BURRS AND SHARP EDGES
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

—	—
SHEET 1	SHEET 2

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
4	NAS1394CA-08L	INSERT, THREADED	5
2	1006951-007	STUD, CAPTIVE	4
1	1020052-3	PLATE, RIGHT REAR	3
1	1020052-2	PLATE, RIGHT FRONT	2
1	1020052-1	BRACKET, ANGLE RIGHT	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020053	1020054

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P. Winfield DATE 11 SEP 63
CHECKED David Conley 16 SEPT. 63
APPROVAL GPK 14 OCT 63
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY
(RIGHT HAND)

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020052
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

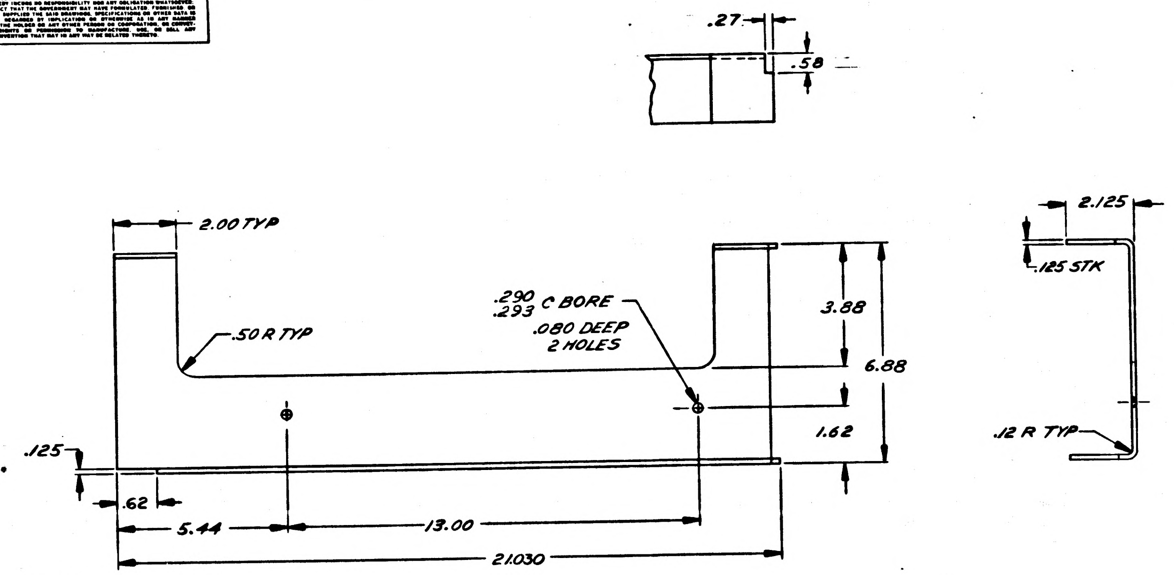
1020052

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

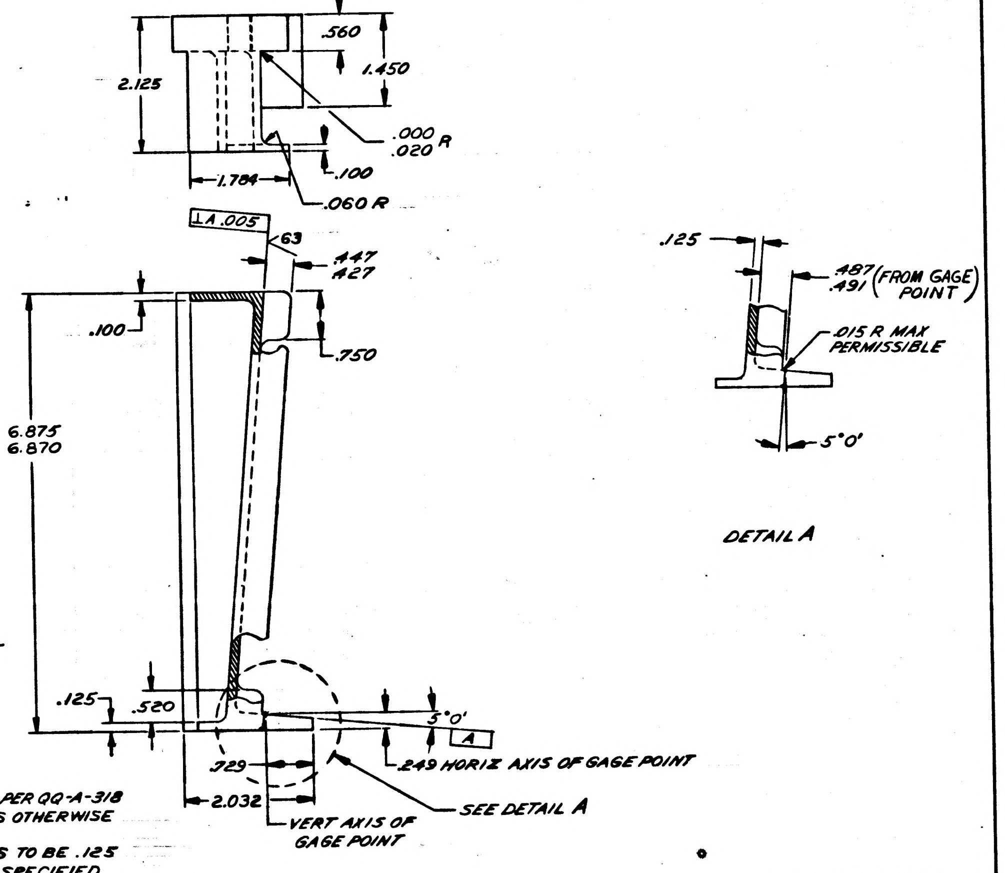
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04138	10/4/63	


.27
.58
2.00 TYP
.50 R TYP
.290
.293 C BORE
.080 DEEP
2 HOLES
3.88
6.88
1.62
.125
.62
5.44
13.00
21.030
2.125
.125 STK
.12 R TYP

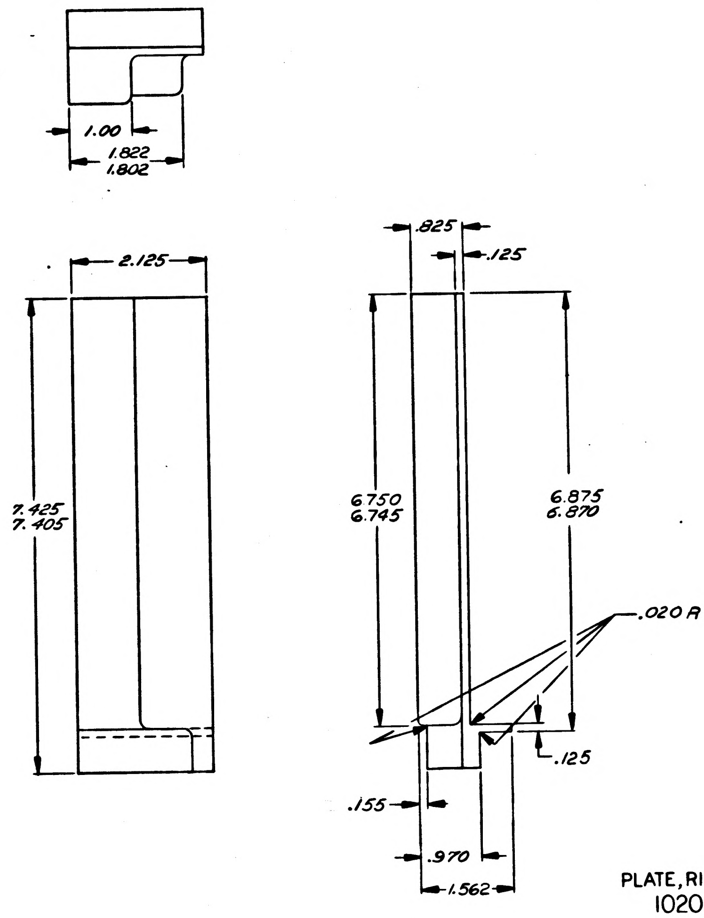
NOTES
1. MATL: AL 5051-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES
3. SCALE 1/2

BRACKET, ANGLE, RIGHT
1020052-1


.560
1.450
2.125
.000
.020 R
1.784
.100
.060 R
⊥ A .005
63
.447
.427
.100
.750
6.875
6.870
.125
.520
.729
2.032
5°0'
A
.249 HORIZ AXIS OF GAGE POINT
SEE DETAIL A
VERT AXIS OF GAGE POINT
.125
.487
.491 (FROM GAGE POINT)
.015 R MAX PERMISSIBLE
5°0'
DETAIL A

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. ALL RADII & FILLETS TO BE .125 UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS & SHARP EDGES
5. SCALE: 1/1

PLATE, RIGHT, FRONT
1020052-2


1.00
1.822
1.802
2.125
7.425
7.405
.825
.125
6.750
6.745
6.875
6.870
.020 R MAX
.125
.155
.970
1.562

PLATE, RIGHT, REAR
1020052-3

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318, TEMP H32
2. 125/ ALL OVER UNLESS OTHERWISE SPECIFIED
3. ALL RADII & FILLETS TO BE .125 UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS & SHARP EDGES
5. SCALE 1/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 04138 DATE 10/24/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1020053	1020054
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .01 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P. Winfield DATE 10 SEP 63
CHECKED [illegible] 17 SEPT. 63
APPROVAL N Morse NR 19 OCT 63
APPROVAL [illegible] 10/14/63
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 24 OCT 63
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY
(RIGHT HAND)

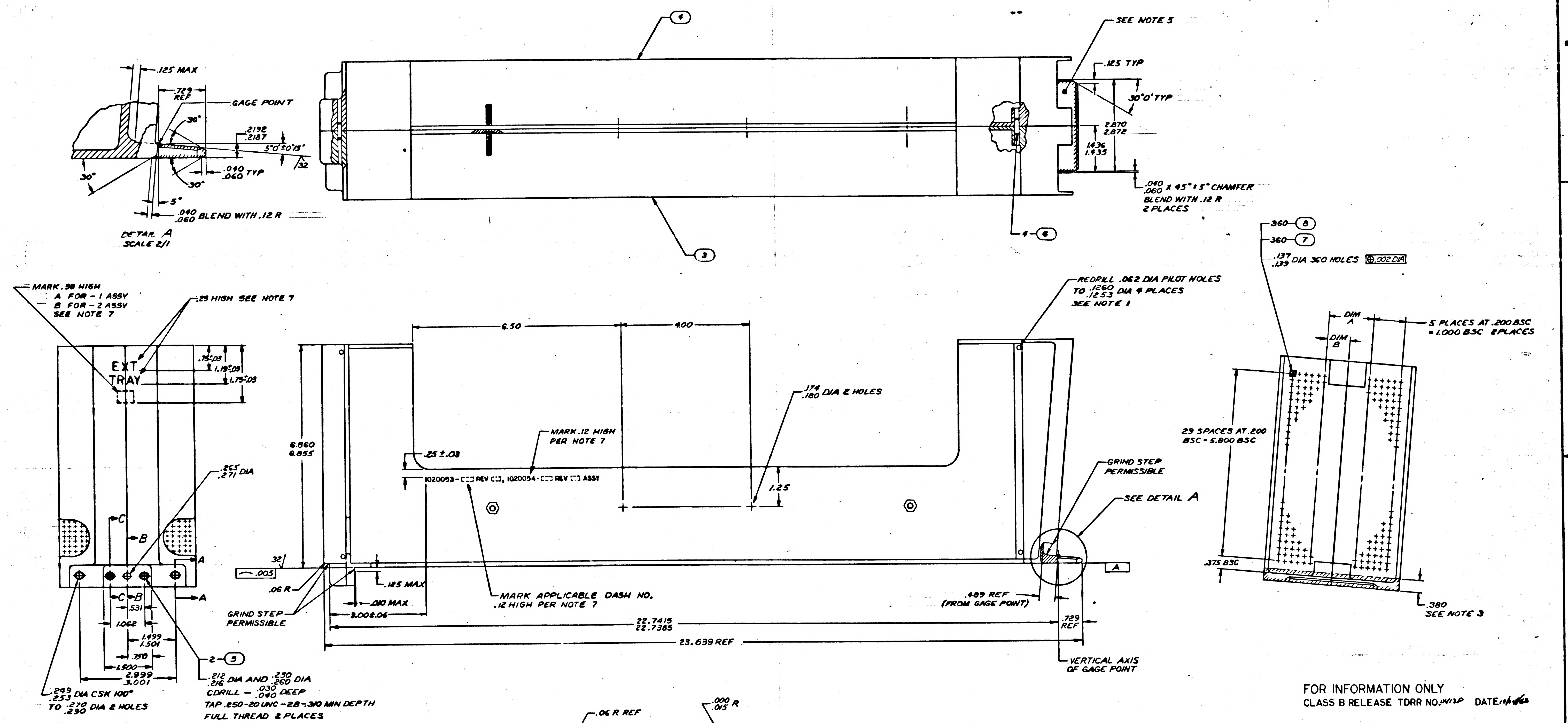
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020052
SCALE NOTED
WT
SHEET 2 OF 2

1020052

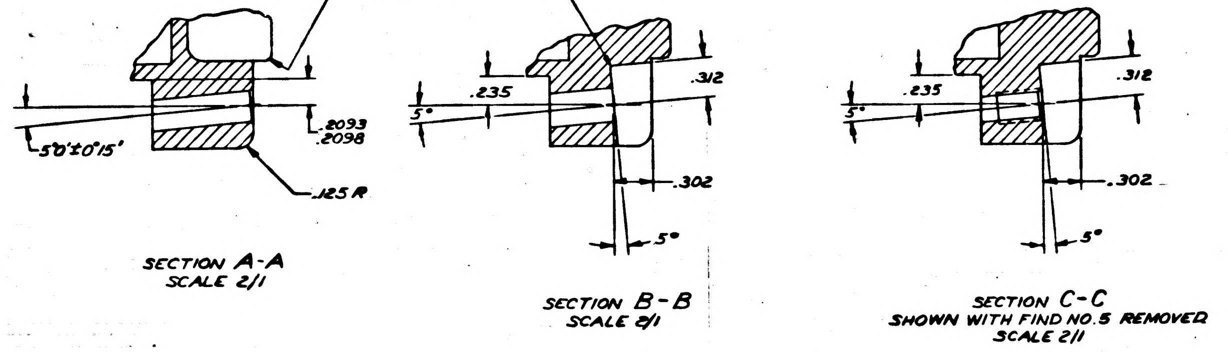
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR. 04128		
A	CLASS II CHANGE PER RD R5586A DR. H Carlson CHK W J Gifford APPD J Conley	28 DEC 63	
B	CHANGED PER TDRR 06899 DR. Ken Budd CHK J Woltkowny APPD J Conley	MAR 64	



DETAIL A
SCALE 2/1
.125 MAX
.729 REF
GAGE POINT
30°
.2192
.2187
5°0'±0°15'
32
.040
.060 TYP
5°
.040
.060 BLEND WITH .12 R
SEE NOTE 5
.125 TYP
30°0' TYP
2.870
2.872
1.936
1.935
.040
.060 X 45°±5° CHAMFER
BLEND WITH .12 R
2 PLACES
4-6
3
4
MARK .38 HIGH
A FOR -1 ASSY
B FOR -2 ASSY
SEE NOTE 7
.25 HIGH SEE NOTE 7
EXT
TRAY
.75±.03
1.19±.03
1.75±.03
.265
.271 DIA
C
B
A
.531
1.062
1.499
1.501
.750
1.500
2.999
3.001
2-5
.249
.253 DIA CSK 100°
TO .270
.290 DIA 2 HOLES
.212
.216 DIA AND .250
.260 DIA
CDRILL — .030
.040 DEEP
TAP .250-20 UNC-2B-.310 MIN DEPTH
FULL THREAD 2 PLACES
6.50
4.00
REDRILL .062 DIA PILOT HOLES
TO .1260
.1253 DIA 4 PLACES
SEE NOTE 1
.174
.180 DIA 2 HOLES
MARK .12 HIGH
PER NOTE 7
6.860
6.855
.25±.03
1020053-▭ REV ▭, 1020054-▭ REV ▭ ASSY
1.25
GRIND STEP PERMISSIBLE
SEE DETAIL A
.005
.06 R
.125 MAX
.010 MAX
3.00±.06
GRIND STEP PERMISSIBLE
MARK APPLICABLE DASH NO.
.12 HIGH PER NOTE 7
.489 REF
(FROM GAGE POINT)
22.7415
22.7385
.729 REF
23.639 REF
VERTICAL AXIS
OF GAGE POINT
360-8
360-7
.137
.135 DIA 360 HOLES ⊕ .002 DIA
DIM A
DIM B
5 PLACES AT .200 BSC
= 1.000 BSC 2 PLACES
29 SPACES AT .200
BSC = 5.800 BSC
.375 BSC
.380
SEE NOTE 3



.06 R REF
.2093
.2098
5°0'±0°15'
.125 R
.000
.015 R
.235
.312
5°
.302

SECTION A-A
SCALE 2/1

SECTION B-B
SCALE 2/1

SECTION C-C
SHOWN WITH FIND NO.5 REMOVED
SCALE 2/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04128 DATE 10/ /63

-2-1 ASSY NOTES:

1. CLAMP FIND NO.3 AND FIND NO. 4 TOGETHER FLUSH AT SURFACE A AND MATCH DRILL AND DOWEL AS FIRST OPERATION
2. REMOVE BURRS AND SHARP EDGES
3. 125√ FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY MATCHED PAIRS BEFORE DISASSEMBLY USING METAL STAMPED CHARACTERS CODED IN SEQUENCE PER ASSY
5. ANODIZE PER MIL-A-8625 TYPE II DYED BLACK. REMOVE ALL DOWEL PINS & DISCARD, PLUG ALL DOWEL HOLES & THREADED INSERT HOLES BEFORE ANODIZING
6. ELECTROLIZE PER QQ-C-320 TYPE II, CL 2
7. MARK WHITE CHARACTERS PER ND1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITY

			REV STATUS OF ASSY
PART NO.	DIM. A	DIM. B	REV SYMBOL
1020053-1	1.400 BSC	.700 BSC	B
1020053-2	1.600 BSC	.800 BSC	B

QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
360	360	1006996-3	CONTACT, MALE WRAPOST	8
360	360	1010383-1	INSULATOR, MALE WRAPOST	7
4	4	MS16556-627	DOWEL PIN	6
2	2	NAS1394CA-08L	INSERT, THREADED	5
1	1	1020047	TRAY, LEFT HAND	4
1	1	1020052	TRAY, RIGHT HAND	3
~~1~~	~~—~~	~~1020053-4~~	~~TRAY EXTENDER B~~	~~2~~
~~—~~	~~1~~	~~1020053-3~~	~~TRAY EXTENDER A~~	~~1~~

LIST OF MATERIALS

NEXT ASSY	USED ON
1020054	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .02 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. C. Taylor DATE 10 Sep 63
CHECKED 4 Oct 63
APPROVAL 14 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

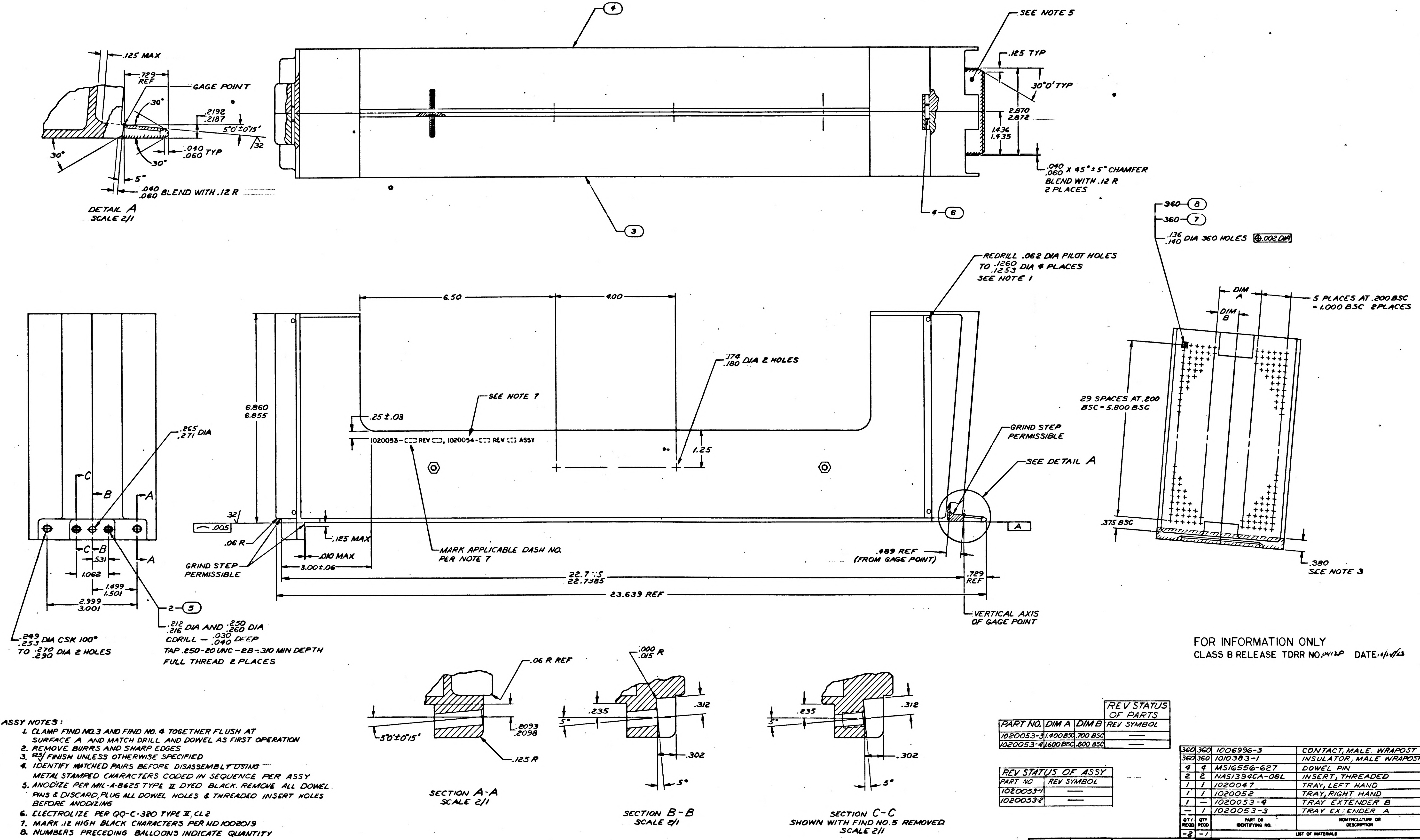
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY EXTENDER
MATCHED MACHINED ASSY

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020053
SCALE 1/1 WT — SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR. 04138	10/24/63	



.125 MAX
.729 REF
GAGE POINT
30°
.2192
.2187
5°0'±0°15'
32
30°
.040
.060 TYP
5°
.040
.060 BLEND WITH .12 R
DETAIL A
SCALE 2/1
4
3
4—6
SEE NOTE 5
.125 TYP
30°0' TYP
2.870
2.872
1.436
1.435
.040
.060 X 45° ± 5° CHAMFER
BLEND WITH .12 R
2 PLACES
360—8
360—7
.136
.140 DIA 360 HOLES ⊕ .002 DIA
REDRILL .062 DIA PILOT HOLES
TO .1260
.1253 DIA 4 PLACES
SEE NOTE 1
6.50
4.00
.174
.180 DIA 2 HOLES
6.860
6.855
SEE NOTE 7
.25±.03
1020053-[ ] REV [ ], 1020054-[ ] REV [ ] ASSY
1.25
GRIND STEP PERMISSIBLE
SEE DETAIL A
32
.005
A
.06 R
.125 MAX
.010 MAX
3.00±.06
MARK APPLICABLE DASH NO. PER NOTE 7
.489 REF
(FROM GAGE POINT)
22.7415
22.7385
.729 REF
23.639 REF
VERTICAL AXIS OF GAGE POINT
.265
.271 DIA
C
B
A
.531
1.062
1.499
1.501
2.999
3.001
2—5
.249
.253 DIA CSK 100°
TO .270
.290 DIA 2 HOLES
.212
.216 DIA AND .250
.260 DIA
CDRILL — .030
.040 DEEP
TAP .250-20 UNC-2B-.310 MIN DEPTH
FULL THREAD 2 PLACES
DIM A
DIM B
5 PLACES AT .200 BSC
= 1.000 BSC 2 PLACES
29 SPACES AT .200
BSC = 5.800 BSC
.375 BSC
.380
SEE NOTE 3
.06 R REF
.2093
.2098
5°0'±0°15'
.125 R
SECTION A-A
SCALE 2/1
.000
.015 R
.235
.312
5°
.302
5°
SECTION B-B
SCALE 2/1
.235
.312
5°
.302
5°
SECTION C-C
SHOWN WITH FIND NO. 5 REMOVED
SCALE 2/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04138 DATE 10/24/63

-2-1 ASSY NOTES:

1. CLAMP FIND NO. 3 AND FIND NO. 4 TOGETHER FLUSH AT SURFACE A AND MATCH DRILL AND DOWEL AS FIRST OPERATION
2. REMOVE BURRS AND SHARP EDGES
3. 125/ FINISH UNLESS OTHERWISE SPECIFIED
4. IDENTIFY MATCHED PAIRS BEFORE DISASSEMBLY USING METAL STAMPED CHARACTERS CODED IN SEQUENCE PER ASSY
5. ANODIZE PER MIL-A-8625 TYPE II DYED BLACK. REMOVE ALL DOWEL PINS & DISCARD, PLUG ALL DOWEL HOLES & THREADED INSERT HOLES BEFORE ANODIZING
6. ELECTROLIZE PER QQ-C-320 TYPE II, CL 2
7. MARK .12 HIGH BLACK CHARACTERS PER ND 1002019
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITY

			REV STATUS OF PARTS
PART NO.	DIM A	DIM B	REV SYMBOL
1020053-3	1.400 BSC	.700 BSC	—
1020053-4	1.600 BSC	.800 BSC	—

REV STATUS OF ASSY	
PART NO	REV SYMBOL
1020053-1	—
1020053-2	—

360	360	1006996-3	CONTACT, MALE WRAPOST	8
360	360	1010383-1	INSULATOR, MALE WRAPOST	7
4	4	MS16556-627	DOWEL PIN	6
2	2	NAS1394CA-08L	INSERT, THREADED	5
1	1	1020047	TRAY, LEFT HAND	4
1	1	1020052	TRAY, RIGHT HAND	3
1	—	1020053-4	TRAY EXTENDER B	2
—	1	1020053-3	TRAY EXTENDER A	1
QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-2	-1	LIST OF MATERIALS		

1020054	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .02 ANGLES ±0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R. C. Taylor DATE 10 Sept 63
CHECKED 4 Oct 63
APPROVAL 14 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY EXTENDER
MATCHED MACHINED

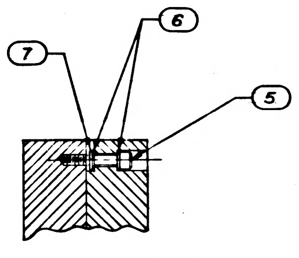
CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020053
SCALE 1/1 WT - SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

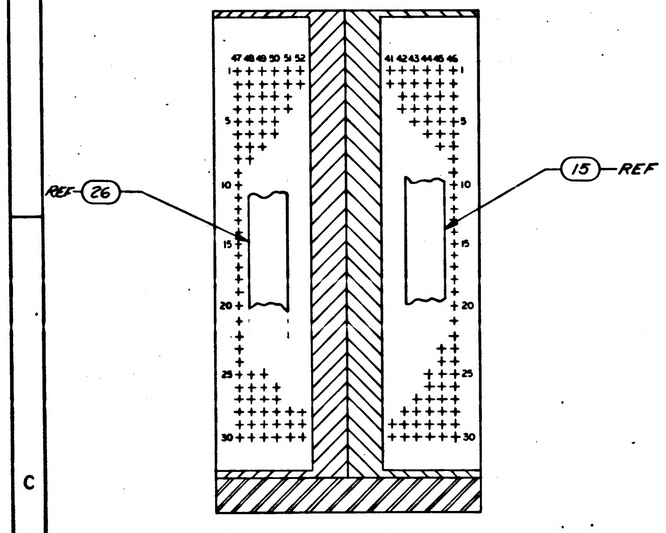
1020053

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

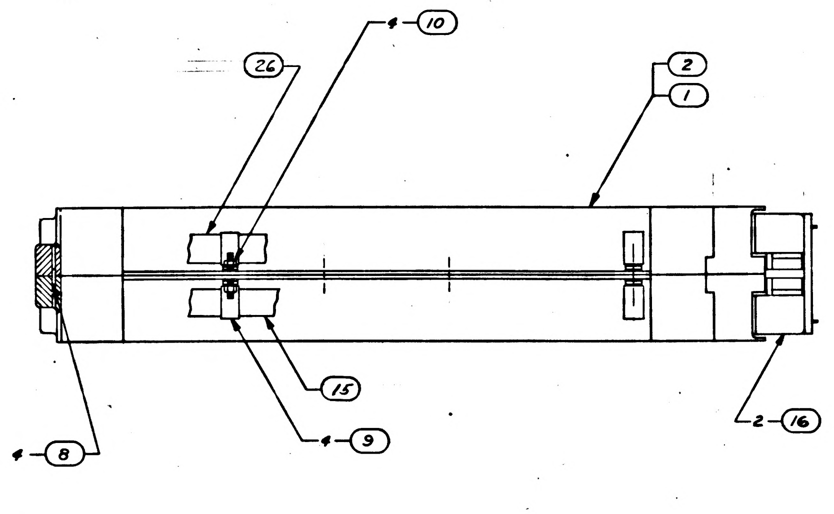


SECTION C-C
SCALE 1/1
4 PLACES

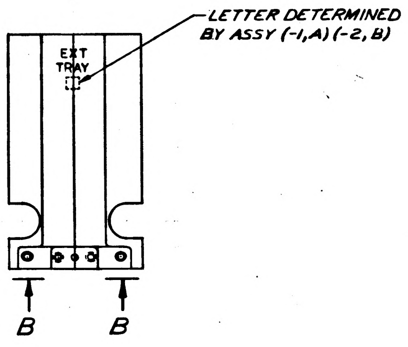


REF-26
15-REF
47 48 49 50 51 52
41 42 43 44 45 46
1
5
10
15
20
25
30

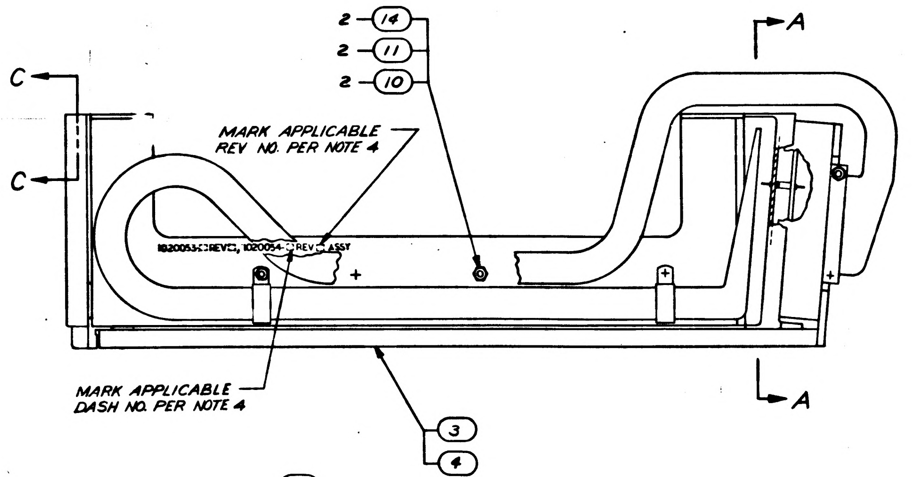
SECTION A-A
SCALE 1/1



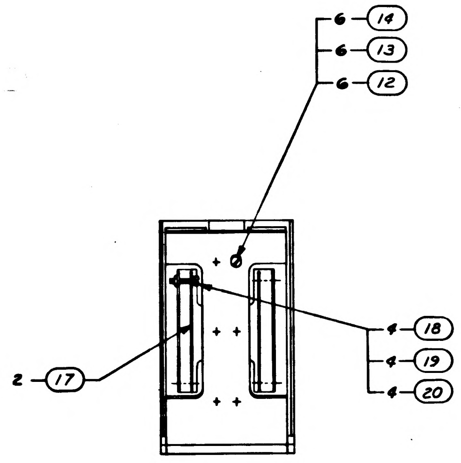
26
4-10
2
1
15
4-9
4-8
2-16



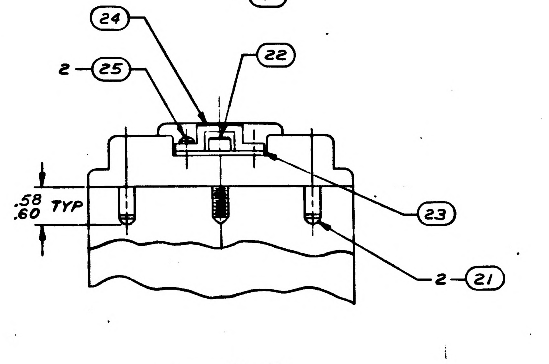
LETTER DETERMINED BY ASSY (-1,A) (-2,B)
EXT TRAY
B
B



C
C
2-14
2-11
2-10
A
A
MARK APPLICABLE REV NO. PER NOTE 4
1020053-1 REV, 1020054-1 REV ASSY
MARK APPLICABLE DASH NO. PER NOTE 4
3
4



6-14
6-13
6-12
4-18
4-19
4-20
2-17



24
2-25
22
.58
.60
TYP
23
2-21

VIEW B-B
SCALE 1/1

NOTES:
1. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
2. FOR SYMBOLS, FABRICATION AND REQD TEST SEE ND1002032
3. SOLDER PER MIL-S-6872
4. MARK .12 HIGH WHITE CHARACTERS PER ND1002019.

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

REV STATUS OF ASSY	
PART NO	REV SYMBOL
1020054-1	—
1020054-2	—

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1	1020088	CABLE ASSY	26
2	2	MS35216-41	SCREW, MACH PAN HD	25
1	1	1004254	RETAINER, JACK SCREW	24
1	1	1004262	PLATE, BACKING	23
1	1	1004261	SCREW, JACK	22
2	2	1010620-3	PIN GUIDE	21
4	4	MS15795-303	WASHER, FLAT	20
4	4	MS35337-78	WASHER, LOCK	19
4	4	MS35234-18	SCREW, MACH PAN HD	18
2	2	1020043	STRIP, CLAMPING	17
2	2	1020040	COVER, CONNECTOR	16
1	1	1020075	CABLE ASSY	15
7	7	MS15795-307	WASHER, FLAT	14
6	6	MS35337-80	WASHER, LOCK	13
6	6	MS35234-48	SCREW, MACH PAN HD	12
2	2	MS35234-47	SCREW, MACH PAN HD	11
6	6	MS21046-C08	NUT, SELF-LOCKING	10
4	4	MS21322-44	CLAMP, LOOP	9
4	4	1004249	PIN, STEP	8
4	4	MS16633-4015	RING, RETAINING	7
8	8	1020083	WASHER, FLAT	6
4	4	1020082	SCREW, JACK	5
1	—	1020044-2	BRACKET, ANGLE	4
—	1	1020044-1	BRACKET, ANGLE	3
1	—	1020053-2	TRAY EXTENDER B	2
—	1	1020053-1	TRAY EXTENDER A	1
-2	-1	LIST OF MATERIALS		

NEXT ASSY	USED ON
1014465	1020002
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 3 Oct 63
CHECKED 5 Oct 63
APPROVAL H. Moss 28 Oct 63
APPROVAL 28 Oct 63
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY EXTENDER ASSY

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020054
SCALE 1/2
WT
SHEET 1 OF 1

1020054

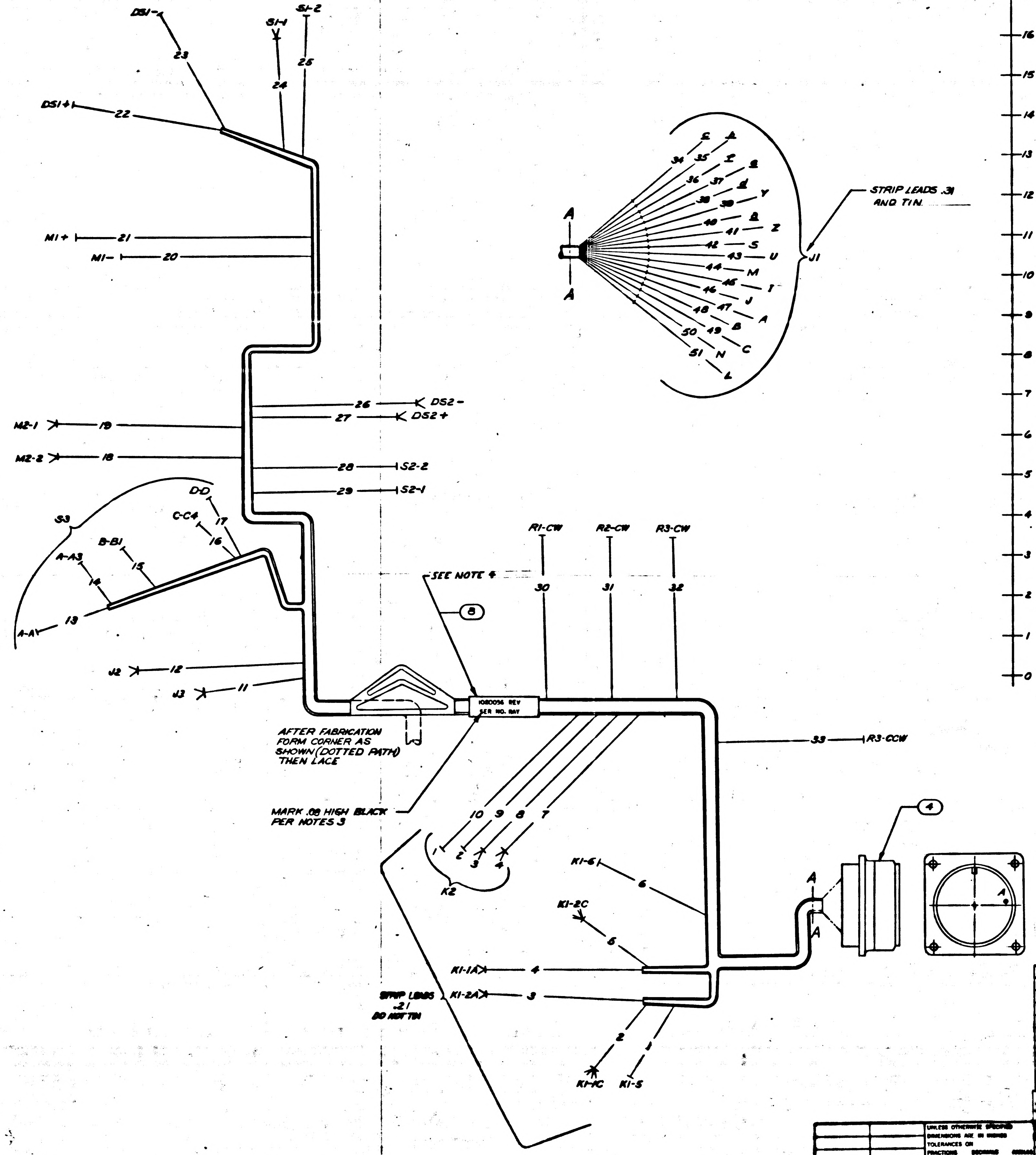
[illegible]

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	22	WHT	18	1	24	
	44				24	SEE TWIST CHART
	45				25	
	46				23	
	21				11	
	20				12	
	12				4	
	11				3	
ATTACH FIND NO. 6	4				51	
	3				50	
	42				28	
	43				26	
	29				27	
	27				18	SEE TWIST CHART
	26				19	
SEE TWIST CHART	18				1	ATTACH FIND NO. 7
	19		18	1	6	
	47		20	2	10	
	48				15	
	49				33	
	30				7	
ATTACH FIND NO. 6	7				14	
	31				8	
ATTACH FIND NO. 6	8				13	
	32				16	
ATTACH FIND NO. 7	9		20	2	17	
	2		22	3	40	SEE TWIST CHART
	5				41	
	2				38	
	5				37	
	2				36	
	5				39	
ATTACH FIND NO. 6	2				34	
	5	WHT	22	3	35	

TWIST CHART

TWIST CHART
44-24 WITH 45-25 AND 46-23
21-11 WITH 20-12
12-4 WITH 11-3
4-51 WITH 3-50
42-28 WITH [illegible]-26
27-18 WITH [illegible]-19
18-1 WITH [illegible]-6
47-10 WITH [illegible]-15 AND 49-33
2-40 WITH 5-41
2-38 WITH 5-37
2-36 WITH 5-39
2-34 WITH 5-35


DS1-
23
S1-1
S1-2
24
25
DS1+
22
M1+
21
M1-
20
26
DS2-
27
DS2+
M2-1
19
M2-2
18
28
S2-2
29
S2-1
S3
D-D
17
C-C4
16
B-B1
15
A-A3
14
A-A
13
J2
12
J3
11
R1-CW
R2-CW
R3-CW
30
31
32
SEE NOTE 4
8
1020056 REV
SER NO. RAY
33
R3-CCW
10
9
8
7
1
2
3
4
K2
K1-6
6
K1-2C
5
K1-1A
4
K1-2A
3
2
1
K1-1C
K1-5
STRIP LEADS .21 DO NOT TIN
4
A
A
A
A
E
A
34
35
I
a
36
37
d
Y
38
39
B
40
41
Z
42
S
43
U
44
M
45
T
46
J
47
A
48
B
49
C
50
N
51
L
J1
STRIP LEADS .31 AND TIN

AFTER FABRICATION FORM CORNER AS SHOWN (DOTTED PATH) THEN LACE

MARK .08 HIGH BLACK PER NOTES 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 4/15/63

NOTES

1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032.
2. SOLDER PER MIL-S-6872.
3. MARK SERIAL NUMBER PER ND1002023
4. BOND FIND NO. 8 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. STRIP .38 AND TIN UNLESS OTHERWISE SPECIFIED

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR NO. 07050 DR FWP CHK APPD	9 APR 64	KEB

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1014369	SCHEMATIC	REF
1	1014472-2	BAND MARKER, CABLE	8
4	MS25036-49	LUG, TERMINAL	7
4	MS25036-53	LUG, TERMINAL	6
2	MS25036-56	LUG, TERMINAL	5
1	MS3102A-36-9P	CONNECTOR	4
AR	MIL-W-16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	3
AR	MIL-W-16878/4 TYPE E 20 WHT	WIRE, ELECTRICAL	2
AR	MIL-W-16878/4 TYPE E 18 WHT	WIRE, ELECTRICAL	1

1014388	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
POWER CONTROL
AGC/CTS OPERATION CONSOLE

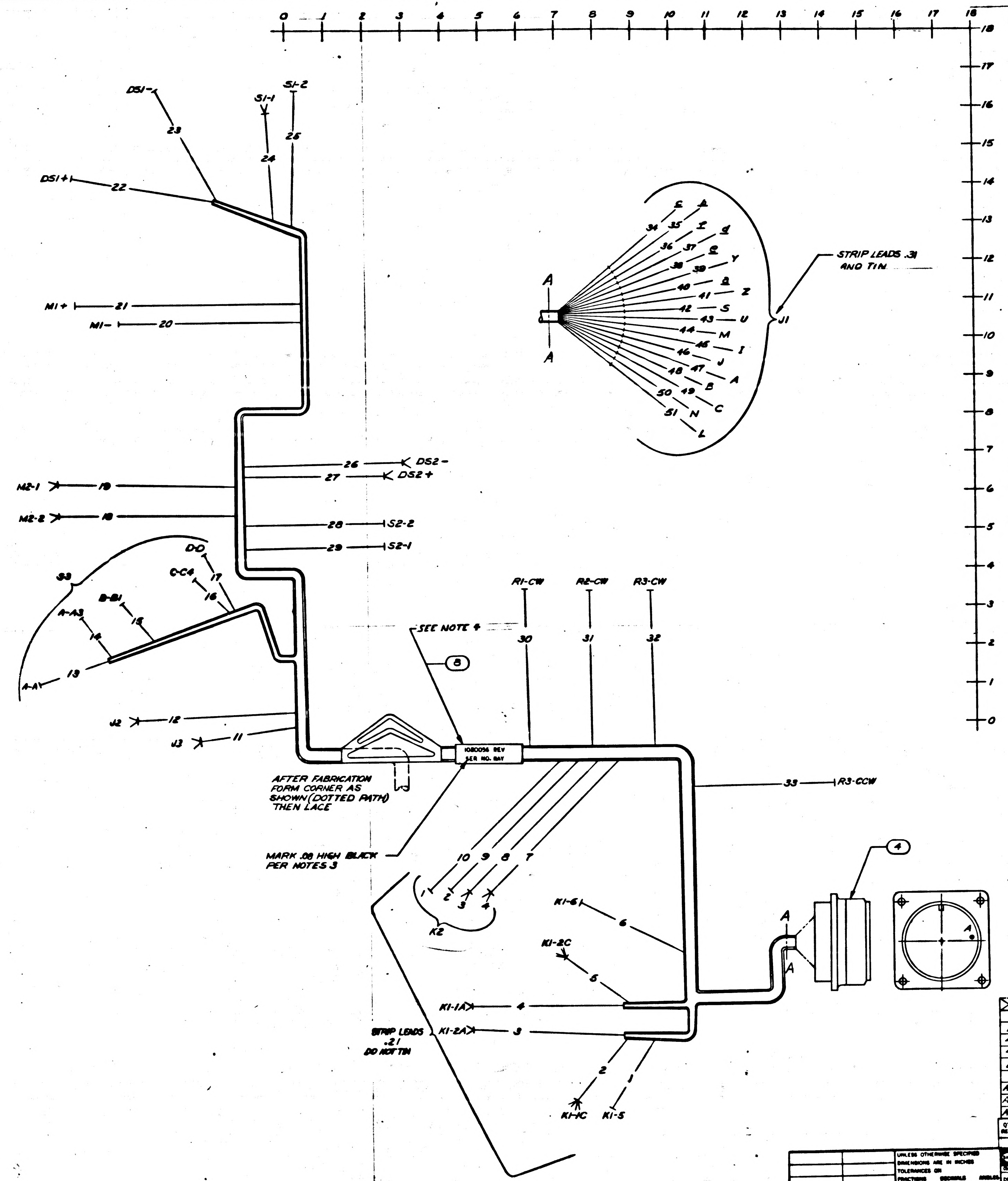
CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	J	1020056

SCALE 1/1 WT SHEET 1 OF 1

[illegible]

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	22	WHT	18	1	24	
	44				24	SEE TWIST CHART
	45				25	
	46				23	
	21				11	
	20				12	
	12				4	
	11				3	
ATTACH FIND NO. 6	4				51	
	3				50	
	42				28	
	43				26	
	29				27	
	27				18	SEE TWIST CHART
	26				19	
SEE TWIST CHART	18				1	ATTACH FIND NO. 7
	19		18	1	6	
	47		20	2	10	
	48				15	
	49				33	
	30				7	
ATTACH FIND NO. 6	7				14	
	31				8	
ATTACH FIND NO. 6	8				13	
	32				16	
ATTACH FIND NO. 7	9		20	2	17	
	2		22	3	40	SEE TWIST CHART
	5				41	
	2				38	
	5				37	
	2				36	
	5				39	
ATTACH FIND NO. 5	2				34	
	5	WHT	22	3	35	

TWIST CHART
44-24 WITH 45-25 AND 46-23
21-11 WITH 20-12
2-4 WITH 11-3
4-51 WITH 3-50
4 -28 WITH 43-26
2 -18 WITH 26-19
1 WITH 19-6
4. 10 WITH 48-15 AND 49-33
2-40 WITH 5-41
2-38 WITH 5-37
2-36 WITH 5-39
2-34 WITH 5-35


DS1-
23
S1-1
S1-2
24
25
DS1+
22
M1+
21
M1-
20
26
DS2-
27
DS2+
M2-1
19
M2-2
18
28
S2-2
29
S2-1
DO
C-C4
17
16
B-B1
15
A-A3
14
A-A1
13
S3
J2
12
J3
11
SEE NOTE 4
8
R1-CW
R2-CW
R3-CW
30
31
32
1020056 REV
SER NO. RAY
33
R3-CCW
AFTER FABRICATION FORM CORNER AS SHOWN (DOTTED PATH) THEN LACE
MARK .08 HIGH BLACK PER NOTES 3
10
9
8
7
1
2
3
4
K2
K1-6
6
K1-2C
5
K1-1A
4
K1-2A
3
STRIP LEADS .21 DO NOT TIN
2
1
K1-1C
K1-5
A
A
4
A
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
Y
Z
S
U
M
I
J
A
B
C
N
L
J1
STRIP LEADS .31 AND TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04347 DATE 4/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032.
2. SOLDER PER MIL-S-6872.
3. MARK SERIAL NUMBER PER ND1002023
4. BOND FIND NO. 8 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. STRIP .38 AND TIN UNLESS OTHERWISE SPECIFIED

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR NO. 07050 DR FWP CHK G Wolkowicz APPD G Marinero	9 APR 64	JEB
B	CHANGED PER TDRR 10974 DR CHK JCJ APPD G Marinero	28 Jul 64	KDB

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1014369	SCHEMATIC	REF
1	1014472-2	BAND MARKER, CABLE	8
4	MS25036-49	LUG, TERMINAL	7
4	MS25036-53	LUG, TERMINAL	6
2	MS25036-56	LUG, TERMINAL	5
1	MS3102A-36-9P	CONNECTOR	4
AR	MIL-W-16878/4 TYPE E 22 WHT	WIRE, ELECTRICAL	3
AR	MIL-W-16878/4 TYPE E 20 WHT	WIRE, ELECTRICAL	2
AR	MIL-W-16878/4 TYPE E 18 WHT	WIRE, ELECTRICAL	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014388	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN DATE
CHECKED 16 Oct 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 5/10/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

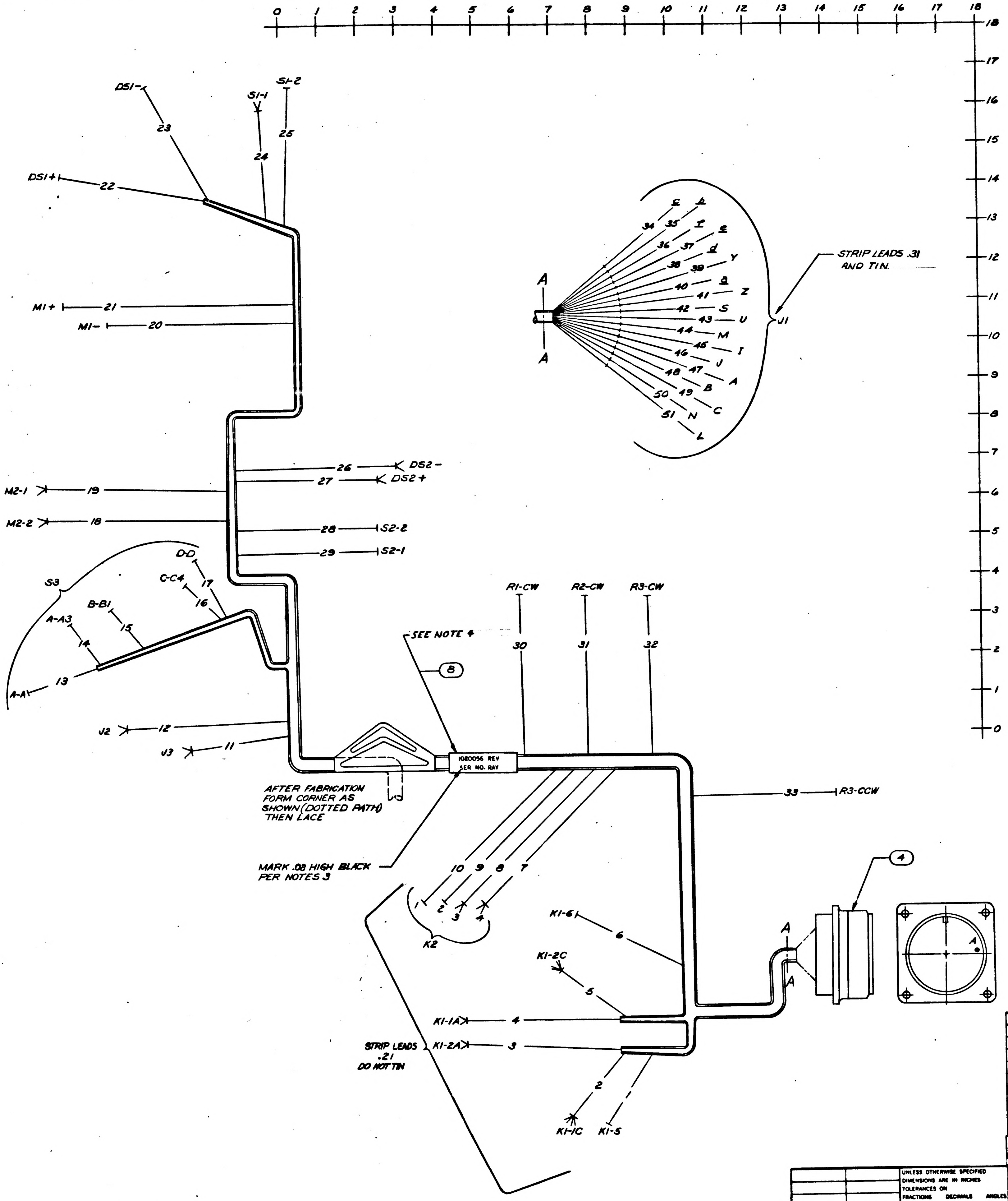
WIRING HARNESS, BRANCHED
POWER CONTROL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020056
SCALE 1/1
WT
SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	22	WHT	18	1	24	
	44				24	SEE TWIST CHART
	45				25	
	46				23	
	21				11	
	20				12	
	12				4	
	11				3	
ATTACH FIND NO. 6	4				51	
	3				50	
	42				28	
	43				26	
	29				27	
	27				18	SEE TWIST CHART
	26				19	
SEE TWIST CHART	18				1	ATTACH FIND NO. 7
	19		18	1	6	
	47		20	2	10	
	48				15	
	49				33	
	30				7	
ATTACH FIND NO. 6	7				14	
	31				8	
ATTACH FIN. NO. 6	8				13	
	32				16	
ATTACH FIND NO. 7	9		20	2	17	
	2		22	3	40	SEE TWIST CHART
	5				41	
	2				38	
	5				37	
	2				36	
	5				39	
ATTACH FIND NO. 5	2				34	
	5	WHT	22	3	35	

TWIST CHART
44-24 WITH 45-25 AND 46-23
21-11 WITH 20-12
12-4 WITH 11-3
4-51 WITH 3-50
42-28 WITH 43-26
27-18 WITH 26-19
18-1 WITH 19-6
47-10 WITH 48-15 AND 49-33
2-40 WITH 5-41
2-38 WITH 5-37
2-36 WITH 5-39
2-34 WITH 5-35


DS1-
DS1+
23
22
S1-1
S1-2
24
25
M1+
21
M1-
20
26
DS2-
27
DS2+
M2-1
19
M2-2
18
28
S2-2
29
S2-1
S3
D-D
C-C4
17
16
B-B1
15
A-A3
14
A-A1
13
J2
12
J3
11
SEE NOTE 4
8
1020056 REV
SER NO. RAY
R1-CW
R2-CW
R3-CW
30
31
32
33
R3-CCW
A
A
c
b
34
35
f
e
36
37
d
Y
38
39
a
40
Z
41
42
S
43
U
44
M
45
I
46
J
47
A
48
B
49
C
50
N
51
L
J1
10
9
8
7
1
2
3
4
K2
K1-6
6
K1-2C
5
K1-1A
4
K1-2A
3
2
1
K1-1C
K1-5
4
A
A
A

STRIP LEADS .31 AND TIN.

AFTER FABRICATION FORM CORNER AS SHOWN (DOTTED PATH) THEN LACE

MARK .08 HIGH BLACK PER NOTES 3

STRIP LEADS .21 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/15/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032.
2. SOLDER PER MIL-S-6872.
3. MARK SERIAL NUMBER PER ND1002023
4. BOND FIND NO. 8 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. STRIP .38 AND TIN UNLESS OTHERWISE SPECIFIED

☒	1014369	SCHEMATIC	REF
1	1014472-1	BAND MARKER, CABLE	8
4	MS25036-49	LUG, TERMINAL	7
4	MS25036-53	LUG, TERMINAL	6
2	MS25036-56	LUG, TERMINAL	5
1	MS3102A-36-9P	CONNECTOR	4
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	3
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 20, WHT	2
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 18, WHT	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014388	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN DATE
CHECKED 16 Oct 63
APPROVAL 28 Oct 63
APPROVAL 28 Oct
APPROVAL
NASA APPROVAL
MIT APPROVAL 11/5/63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
POWER CONTROL
AGC/CTS OPERATION CONSOLE

CODE IDENT NO.	SIZE	NASA DRAWING NO
—	J	1020056
SCALE 1/1	WT	SHEET 1 OF 1

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR 04356	[illegible] 63	
A	CL II CHANGE PER RD R5682 DR. CHK APPD	8 JAN 64	
B	CHANGED PER TDRR 06900 DR. CHK APPD	[illegible] MAR 64	

JUMPER LIST

LEAD NO.	FROM	TO	LENGTH	FIND NO.
A	XDS1-B	XDS2-B	2	4
B	XDS2-B	XDS3-B	2	
C	XDS3-B	XDS4-B	2.25	
D	XDS4-B	XDS5-B	2	
E	XDS5-B	XDS6-B	2	
F	XDS6-B	XDS7-B	2.25	
G	XDS7-B	XDS8-B	2	
H	XDS8-B	XDS24-B	3	
J	XDS9-B	XDS10-B	2.25	
K	XD10-B	XDS11-B	2	
L	XDS11-B	XDS12-B	2	
M	XDS12-B	XDS13-B	2.25	
N	XDS13-B	XDS14-B	2	
P	XDS14-B	XDS15-B	2	
R	XDS15-B	XDS16-B	2	
S	XDS16-B	XDS32-B	2.25	
T	XDS31-B	XDS38-B	3	
U	XDS31-B	XDS30-B	2	
V	XDS30-B	XDS29-B	2	
W	XDS29-B	XDS28-B	2.25	
X	XDS28-B	XDS27-B	2	
Y	XDS27-B	XDS26-B	2	
Z	XDS26-B	XDS25-B	2.25	
AA	XDS21-B	XDS34-A	3	
AB	XDS24-B	XDS23-B	2	
AC	XDS23-B	XDS22-B	2.25	
AD	XDS9-B	XDS25-B	3	
AE	XDS21-B	XDS20-B	2	
AF	XDS20-B	XDS19-B	2.25	
AG	XDS19-B	XDS18-B	2	
AH	XDS18-B	XDS17-B	2	
AJ	XDS38-B	XDS37-B	2	
AK	XDS37-B	XDS36-B	2.50	
AM	XDS36-B	XDS35-B	2	
AN	XDS35-B	XDS39-B	2.75	
AP	XDS39-B	XDS40-B	2	
AR	XDS40-B	XDS41-B	2.50	
AS	XDS41-B	XDS42-B	2	
AT	XDS33-B	XDS34-A	2.50	4
AU	S1-3	S35-3	2.50	1
AV	S1-1	XDS43-A	2	1
AW	S35-1	XDS44-A	2	1
AX	S5-A	S5-B	1.50	4
AY	S5-B	S5-C	2.50	4
AZ	S5-C	S5-D	1.50	4
BA	S5-2	S5-A	2.25	4
BB	S5-1	S5-6	2.25	3
BC	S5-SW2-NO	S5-1	3.25	3
BD	S5-SW4-C	S6-SW4-C	2.75	2
BE	S5-SW2-NC	S6-SW2-C	2.75	3
BF	S5-2	S6-SW1-NC	4.50	4
BG	S6-SW1-NO	S6-2	3.25	4
BH	S6-2	S6-A	2.25	4
BJ	S6-A	S6-B	1.50	4
BK	S6-B	S6-C	2.50	4
BL	S6-C	S6-D	1.50	4

JUMPER LIST

LEAD NO.	FROM	TO	LENGTH	FIND NO.
BM	S6-6	S6-1	2.25	3
BN	S6-1	S6-SW2-NO	3.25	3
BP	S6-SW1-C	S7-SW1-NC	2.75	4
BR	S6-SW2-NC	S7-SW2-C	2.75	3
BS	S6-SW4-C	S7-SW4-C	2.75	2
BT	S7-SW4-C	S8-SW4-C	2.75	2
BU	S7-SW1-NO	S7-2	3.25	4
BV	S7-2	S7-A	2.25	4
BW	S7-A	S7-B	1.50	4
BX	S7-B	S7-C	2.50	4
BY	S7-C	S7-D	1.50	4
BZ	S7-6	S7-1	2.25	3
CA	S7-1	S7-SW2-NO	3.25	3
CB	S7-SW2-NC	S8-SW2-C	2.75	3
CC	S7-SW1-C	S8-SW1-NC	2.75	4
CD	S8-SW4-C	S9-SW4-C	2.75	2
CE	S8-SW1-NO	S8-2	3.25	4
CF	S8-2	S8-A	2.25	4
CG	S8-A	S8-B	1.50	4
CH	S8-B	S8-C	2.50	4
CJ	S8-C	S8-D	1.50	4
CK	S8-6	S8-1	2.25	3
CL	S8-1	S8-SW2-NO	3.25	3
CM	S8-SW2-NC	S9-SW2-C	2.75	3
CN	S8-SW1-C	S9-SW1-NC	2.75	4
CP	S9-SW4-C	S10-SW4-C	2.75	2
CR	S9-SW1-NO	S9-2	3.25	4
CS	S9-2	S9-A	2.25	4
CT	S9-A	S9-B	1.50	4
CU	S9-B	S9-C	2.50	4
CV	S9-C	S9-D	1.50	4
CW	S9-6	S9-1	2.25	3
CX	S9-1	S9-SW2-NO	3.25	3
CY	S9-SW2-NC	S10-SW2-C	2.75	3
CZ	S9-SW1-C	S10-SW1-NC	2.75	4
DA	S10-SW4-C	S11-SW4-C	2.75	2
DB	S10-SW1-NO	S10-2	3.25	4
DC	S10-2	S10-A	2.25	4
DD	S10-A	S10-B	1.50	4
DE	S10-B	S10-C	2.50	4
DF	S10-C	S10-D	1.50	4
DG	S10-6	S10-1	2.25	3
DH	S10-1	S10-SW2-NO	3.25	3
DJ	S10-SW2-NC	S11-SW2-C	2.75	3
DK	S10-SW1-C	S11-SW1-NC	2.75	4
DL	S10-SW3-C	S11-SW3-NC	2.75	2
DM	S11-SW4-C	S12-SW4-C	2.75	2
DN	S11-SW1-NO	S11-2	3.25	4
DP	S11-2	S11-A	2.25	4
DR	S11-A	S11-B	1.50	4
DS	S11-B	S11-C	2.50	4
DT	S11-C	S11-D	1.50	4
DU	S11-6	S11-1	2.25	3
DV	S11-1	S11-SW2-NO	3.25	3
DW	S11-SW2-NC	S12-SW2-C	2.75	3
DX	S11-SW1-C	S12-SW1-NC	2.75	4
DY	S11-SW3-C	S12-SW3-NC	2.75	2
DZ	S12-SW4-C	S13-SW4-C	2.75	2

JUMPER LIST

LEAD NO.	FROM	TO	LENGTH	FIND NO.
EA	S12-SW1-NO	S12-2	3.25	4
EB	S12-2	S12-A	2.25	4
EC	S12-A	S12-B	1.50	4
ED	S12-B	S12-C	2.50	4
EE	S12-C	S12-D	1.50	4
EF	S12-6	S12-1	2.25	3
EG	S12-1	S12-SW2-NO	3.25	3
EH	S12-SW2-NC	S13-SW2-C	2.75	3
EJ	S12-SW1-C	S13-SW1-NC	2.75	4
EK	S12-SW3-C	S12-SW4-C	1	2
EL	S13-SW4-C	S14-SW4-C	2.75	2
EM	S13-SW1-NO	S13-2	3.25	4
EN	S13-2	S13-A	2.25	4
EP	S13-A	S13-B	1.50	4
ER	S13-B	S13-C	2.50	4
ES	S13-C	S13-D	1.50	4
ET	S13-6	S13-1	2.25	3
EU	S13-1	S13-SW2-NO	3.25	3
EV	S13-SW2-NC	S14-SW2-C	2.75	3
EW	S13-SW1-C	S14-SW1-NC	2.75	4
EX	S14-SW4-C	S15-SW4-C	2.75	2
EY	S14-SW1-NO	S14-2	3.25	4
EZ	S14-2	S14-A	2.25	4
FA	S14-A	S14-B	1.50	4
FB	S14-B	S14-C	2.50	4
FC	S14-C	S14-D	1.50	4
FD	S14-6	S14-1	2.25	3
FE	S14-1	S14-SW2-NO	3.25	3
FF	S14-SW2-NC	S15-1	3.25	3
FG	S14-SW1-C	S15-SW1-NC	2.75	4
FH	S15-SW1-NO	S15-2	3.25	4
FJ	S15-2	S15-A	2.25	4
FK	S15-A	S15-B	1.50	4
FL	S15-B	S15-C	2.50	4
FM	S15-C	S15-D	1.50	4
FN	S15-6	S15-1	2.25	3
FP	S33-1	S33-3	1.50	2
FR	S33-1	S32-3	2.75	2
FS	S17-2	S17-4	4.50	2
FT	XDS1-B	XDS17-B	2.50	4
FU	S16-1	S16-3	1.50	2
FV	S16-3	S19-1	2.25	2
FW	S19-1	S19-3	1.50	2
FX	S2-2	S3-4	1.75	2
FY	S28-C	S24-C	2.25	2
FZ	S24-C	S20-C	2.25	2
GA	S20-C	S21-C	2.25	2
GB	S21-C	S25-C	2.25	2
GC	S31-C	S27-C	2.25	2
GD	S27-C	S23-C	2.25	2
GE	S22-C	S26-C	2.25	2
GF	S26-C	S30-C	2.25	2
GG	S32-3	S32-1	1.5	2
GH	S23-C	S22-C	2.5	2
GJ	S22-C	S21-C	2.5	2

JUMPER LIST

LEAD NO.	FROM	TO	LENGTH	FIND NO.
GK	XDS38B	XDS45B	2.25	4

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04356 DATE 11/5/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE MD1002032
2. SOLDER PER MIL-S-6872

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	MIL-W-16878/4 TYPE E, 22 RED	WIRE, ELECTRICAL	4
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELECTRICAL	3
AR	MIL-W-16878/4 TYPE E, 22 ORN	WIRE, ELECTRICAL	2
AR	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELECTRICAL	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014143	1014309

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LEAD, ELECTRICAL PROGRAMMER AND MONITOR FRONT PANEL

CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020057
SCALE NONE WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020057

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLB RELEASED PER TDRR		
A	CL II CHANGE PER RD R5682 DR. RDG CHK W.J. Gifford APPD	8 JAN 64	
B	CHANGED PER TDRR 06900 DR. CHK APPD	MAR 64	
C	CLASS II CHANGE PER RD R5952A DR CHK APPD	15 APR 64	
D	CHANGED PER TDRR 10108 DR CHK APPD	JUNE 64	

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
A	XDS1-B	XDS2-B	2	4
B	XDS2-B	XDS3-B	2	
C	XDS3-B	XDS4-B	2.25	
D	XDS4-B	XDS5-B	2	
E	XDS5-B	XDS6-B	2	
F	XDS6-B	XDS7-B	2.25	
G	XDS7-B	XDS8-B	2	
H	XDS8-B	XDS24-B	3	
J	XDS9-B	XDS10-B	2.25	
K	XD10-B	XDS11-B	2	
L	XDS11-B	XDS12-B	2	
M	XDS12-B	XDS13-B	2.25	
N	XDS13-B	XDS14-B	2	
P	XDS14-B	XDS15-B	2	
R	XDS15-B	XDS16-B	2	
S	XDS16-B	XDS32-B	2.25	
T	XDS31-B	XDS38-B	3	
U	XDS31-B	XDS30-B	2	
V	XDS30-B	XDS29-B	2	
W	XDS29-B	XDS28-B	2.25	
X	XDS28-B	XDS27-B	2	
Y	XDS27-B	XDS26-B	2	
Z	XDS26-B	XDS25-B	2.25	
AA	XDS21-B	XDS34-A	3	
AB	XDS24-B	XDS23-B	2	
AC	XDS23-B	XDS22-B	2.25	
AD	XDS9-B	XDS25-B	3	
AE	XDS21-B	XDS20-B	2	
AF	XDS20-B	XDS19-B	2.25	
AG	XDS19-B	XDS18-B	2	
AH	XDS18-B	XDS17-B	2	
AJ	XDS38-B	XDS37-B	2	
AK	XDS37-B	XDS36-B	2.50	
AM	XDS36-B	XDS35-B	2	
AN	XDS35-B	XDS39-B	2.75	
AP	XDS39-B	XDS40-B	2	
AR	XDS40-B	XDS41-B	2.50	
AS	XDS41-B	XDS42-B	2	
AT	XDS33-B	XDS34-A	2.50	4
AU	S1-3	S35-3	2.50	1
AV	S1-1	XDS43-A	2	1
AW	S35-1	XDS44-A	2	1
AX	S5-A	S5-B	1.50	4
AY	S5-B	S5-C	2.50	4
AZ	S5-C	S5-D	1.50	4
BA	S5-2	S5-A	2.25	4
BB	S5-1	S5-6	2.25	3
BC	S5-SW2-NO	S5-1	3.25	3
BD	S5-SW4-C	S6-SW4-C	2.75	2
BE	S5-SW2-NC	S6-SW2-C	2.75	3
BF	S5-2	S6-SW1-NC	4.50	4
BG	S6-SW1-NO	S6-2	3.25	4
BH	S6-2	S6-A	2.25	4
BJ	S6-A	S6-B	1.50	4
BK	S6-B	S6-C	2.50	4
BL	S6-C	S6-D	1.50	4

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
BM	S6-6	S6-1	2.25	3
BN	S6-1	S6-SW2-NO	3.25	3
BP	S6-SW1-C	S7-SW1-NC	2.75	4
BR	S6-SW2-NC	S7-SW2-C	2.75	3
BS	S6-SW4-C	S7-SW4-C	2.75	2
BT	S7-SW4-C	S8-SW4-C	2.75	2
BU	S7-SW1-NO	S7-2	3.25	4
BV	S7-2	S7-A	2.25	4
BW	S7-A	S7-B	1.50	4
BX	S7-B	S7-C	2.50	4
BY	S7-C	S7-D	1.50	4
BZ	S7-6	S7-1	2.25	3
CA	S7-1	S7-SW2-NO	3.25	3
CB	S7-SW2-NC	S8-SW2-C	2.75	3
CC	S7-SW1-C	S8-SW1-NC	2.75	4
CD	S8-SW4-C	S9-SW4-C	2.75	2
CE	S8-SW1-NO	S8-2	3.25	4
CF	S8-2	S8-A	2.25	4
CG	S8-A	S8-B	1.50	4
CH	S8-B	S8-C	2.50	4
CJ	S8-C	S8-D	1.50	4
CK	S8-6	S8-1	2.25	3
CL	S8-1	S8-SW2-NO	3.25	3
CM	S8-SW2-NC	S9-SW2-C	2.75	3
CN	S8-SW1-C	S9-SW1-NC	2.75	4
CP	S9-SW4-C	S10-SW4-C	2.75	2
CR	S9-SW1-NO	S9-2	3.25	4
CS	S9-2	S9-A	2.25	4
CT	S9-A	S9-B	1.50	4
CU	S9-B	S9-C	2.50	4
CV	S9-C	S9-D	1.50	4
CW	S9-6	S9-1	2.25	3
CX	S9-1	S9 SW2-NO	3.25	3
CY	S9-SW2-NC	S10-SW2-C	2.75	3
CZ	S9-SW1-C	S10-SW1-NC	2.75	4
DA	S10-SW4-C	S11-SW4-C	2.75	2
DB	S10-SW1-NO	S10-2	3.25	4
DC	S10-2	S10-A	2.25	4
DD	S10-A	S10-B	1.50	4
DE	S10-B	S10-C	2.50	4
DF	S10-C	S10-D	1.50	4
DG	S10-6	S10-1	2.25	3
DH	S10-1	S10-SW2-NO	3.25	3
DJ	S10-SW2-NC	S11-SW2-C	2.75	3
DK	S10-SW1-C	S11-SW1-NC	2.75	4
DL	S10-SW3-C	S11-SW3-NC	2.75	2
DM	S11-SW4-C	S12-SW4-C	2.75	2
DN	S11-SW1-NO	S11-2	3.25	4
DP	S11-2	S11-A	2.25	4
DR	S11-A	S11-B	1.50	4
DS	S11-B	S11-C	2.50	4
DT	S11-C	S11-D	1.50	4
DU	S11-6	S11-1	2.25	3
DV	S11-1	S11-SW2-NO	3.25	3
DW	S11-SW2-NC	S12-SW2-C	2.75	3
DX	S11-SW1-C	S12-SW1-NC	2.75	4
DY	S11-SW3-C	S12-SW3-NC	2.75	2
DZ	S12-SW4-C	S13-SW4-C	2.75	2

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
EA	S12-SW1-NO	S12-2	3.25	4
EB	S12-2	S12-A	2.25	4
EC	S12-A	S12-B	1.50	4
ED	S12-B	S12-C	2.50	4
EE	S12-C	S12-D	1.50	4
EF	S12-G	S12-1	2.25	3
EG	S12-1	S12-SW2-NO	3.25	3
EH	S12-SW2-NC	S13-SW2-C	2.75	3
EJ	S12-SW1-C	S13-SW1-NC	2.75	4
EK	S12-SW3-C	S12-SW4-C	1	2
EL	S13-SW4-C	S14-SW4-C	2.75	2
EM	S13-SW1-NO	S13-2	3.25	4
EN	S13-2	S13-A	2.25	4
EP	S13-A	S13-B	1.50	4
ER	S13-B	S13-C	2.50	4
ES	S13-C	S13-D	1.50	4
ET	S13-G	S13-1	2.25	3
EU	S13-1	S13-SW2-NO	3.25	3
EV	S13-SW2-NC	S14-SW2-C	2.75	3
EW	S13-SW1-C	S14-SW1-NC	2.75	4
EX	S14-SW4-C	S15-SW4-C	2.75	2
EY	S14-SW1-NO	S14-2	3.25	4
EZ	S14-2	S14-A	2.25	4
FA	S14-A	S14-B	1.50	4
FB	S14-B	S14-C	2.50	4
FC	S14-C	S14-D	1.50	4
FD	S14-G	S14-1	2.25	3
FE	S14-1	S14-SW2-NO	3.25	3
FF	S14-SW2-NC	S15-1	3.25	3
FG	S14-SW1-C	S15-SW1-NC	2.75	4
FH	S15-SW1-NO	S15-2	3.25	4
FJ	S15-2	S15-A	2.25	4
FK	S15-A	S15-B	1.50	4
FL	S15-B	S15-C	2.50	4
FM	S15-C	S15-D	1.50	4
FN	S15-6	S15-1	2.25	3
FP	S33-1	S33-3	1.50	2
FR	S33-1	S32-3	2.75	2
FS	S17-2	S17-4	4.50	2
FT	XDS1-B	XDS17-B	2.50	4
FU	S16-1	S16-3	1.50	2
FV	S16-3	S19-1	2.25	2
FW	S19-1	S19-3	1.50	2
FX	S2-2	S3-4	1.75	2
FY	S28-C	S24-C	2.25	2
FZ	S24-C	S20-C	2.25	2
GA	S20-C	S21-C	2.25	2
GB	S21-C	S25-C	2.25	2
GC	S31-C	S27-C	2.25	2
GD	S27-C	S23-C	2.25	2
GE	S22-C	S26-C	2.25	2
GF	S26-C	S30-C	2.25	2
GG	S32-3	S32-1	1.5	2
GH	S23-C	S22-C	2.5	2
GJ	S22-C	S21-C	2.5	2

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
GK	XDS38B	XDS45B	2.25	4
GL	S5-SW2-C	S13-SW3-NO	12.50	3
GM	S13-SW3-NO	S15-SW3-NO	3.50	3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE 11/15/63

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE MDK02032
2. SOLDER PER MIL-S-6872

AR	MIL-W-16878/4 TYPE E, 22 RED	WIRE, ELECTRICAL	4
AR	MIL-W-16878/4 TYPE E, 22 BLK	WIRE, ELECTRICAL	3
AR	MIL-W-16878/4 TYPE E, 22 ORN	WIRE, ELECTRICAL	2
AR	MIL-W-16878/4 TYPE E, 22 WHT	WIRE, ELECTRICAL	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014143	1014309
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED 12 Oct 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LEAD, ELECTRICAL
PROGRAMMER AND MONITOR
FRONT PANEL

CODE IDENT NO. —— SIZE F NASA DRAWING NO. 1020057
SCALE NONE WT SHEET 1 OF 7

1020057

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLB RELEASED PER TDRR 04356		

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
A	XDS1-B	XDS2-B	2	4
B	XDS2-B	XDS3-B	2	
C	XDS3-B	XDS4-B	2.25	
D	XDS4-B	XDS5-B	2	
E	XDS5-B	XDS6-B	2	
F	XDS6-B	XDS7-B	2.25	
G	XDS7-B	XDS8-B	2	
H	XDS8-B	XDS24-B	3	
J	XDS9-B	XDS10-B	2.25	
K	XD10-B	XDS11-B	2	
L	XDS11-B	XDS12-B	2	
M	XDS12-B	XDS13-B	2.25	
N	XDS13-B	XDS14-B	2	
P	XDS14-B	XDS15-B	2	
R	XDS15-B	XDS16-B	2	
S	XDS16-B	XDS32-B	2.25	
T	XDS31-B	XDS38-B	5	
U	XDS31-B	XDS30-B	2	
V	XDS30-B	XDS29-B	2	
W	XDS29-B	XDS28-B	2.25	
X	XDS28-B	XDS27-B	2	
Y	XDS27-B	XDS26-B	2	
Z	XDS26-B	XDS25-B	2.25	
AA	XDS21-B	XDS34-A	5	
AB	XDS24-B	XDS23-B	2	
AC	XDS23-B	XDS22-B	2.25	
AD	XDS9-B	XDS25-B	3	
AE	XDS21-B	XDS20-B	2	
AF	XDS20-B	XDS19-B	2.25	
AG	XDS19-B	XDS18-B	2	
AH	XDS18-B	XDS17-B	2	
AJ	XDS38-B	XDS37-B	2	
AK	XDS37-B	XDS36-B	2.50	
AM	XDS36-B	XDS35-B	2	
AN	XDS35-B	XDS39-B	2.75	
AP	XDS39-B	XDS40-B	2	
AR	XDS40-B	XDS41-B	2.50	
AS	XDS41-B	XDS42-B	2	
AT	XDS33-B	XDS34-A	2.50	4
AU	S1-3	S35-3	2.50	1
AV	S1-1	XDS43-A	2	1
AW	S35-1	XDS44-A	2	1
AX	S5-A	S5-B	1.50	4
AY	S5-B	S5-C	2.50	4
AZ	S5-C	S5-D	1.50	4
BA	S5-2	S5-A	2.25	4
BB	S5-1	S5-G	2.25	3
BC	S5-SW2-NO	S5-1	3.25	3
BD	S5-SW4-C	S6-SW4-C	2.75	2
BE	S5-SW2-NC	S6-SW1-NC	2.75	3
BF	S5-2	S6-SW1-NC	4.50	4
BG	S6-SW1-NO	S6-2	3.25	4
BH	S6-2	S6-A	2.25	4
BJ	S6-A	S6-B	1.50	4
BK	S6-B	S6-C	2.50	4
BL	S6-C	S6-D	1.50	4

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO.
BM	S6-G	S6-1	2.25	3
BN	S6-1	S6-SW2-NO	3.25	3
BP	S6-SW1-C	S7-SW1-NC	2.75	4
BR	S6-SW2-NC	S7-SW2-C	2.75	3
BS	S6-SW4-C	S7-SW4-C	2.75	2
BT	S7-SW4-C	S8-SW4-C	2.75	2
BU	S7-SW1-NO	S7-2	3.25	4
BV	S7-2	S7-A	2.25	4
BW	S7-A	S7-B	1.50	4
BX	S7-B	S7-C	2.50	4
BY	S7-C	S7-D	1.50	4
BZ	S7-G	S7-1	2.25	3
CA	S7-1	S7-SW2-NO	3.25	3
CB	S7-SW2-NC	S8-SW2-C	2.75	3
CC	S7-SW1-C	S8-SW1-NC	2.75	4
CD	S8-SW4-C	S9-SW4-C	2.75	2
CE	S8-SW1-NO	S8-2	3.25	4
CF	S8-2	S8-A	2.25	4
CG	S8-A	S8-B	1.50	4
CH	S8-B	S8-C	2.50	4
CJ	S8-C	S8-D	1.50	4
CK	S8-G	S8-1	2.25	3
CL	S8-1	S8-SW2-NO	3.25	3
CM	S8-SW2-NC	S9-SW2-C	2.75	3
CN	S8-SW1-C	S9-SW1-NC	2.75	4
CP	S9-SW4-C	S10-SW4-C	2.75	2
CR	S9-SW1-NO	S9-2	3.25	4
CS	S9-2	S9-A	2.25	4
CT	S9-A	S9-B	1.50	4
CU	S9-B	S9-C	2.50	4
CV	S9-C	S9-D	1.50	4
CW	S9-G	S9-1	2.25	3
CX	S9-1	S9-SW2-NO	3.25	3
CY	S9-SW2-NC	S10-SW2-C	2.75	3
CZ	S9-SW1-C	S10-SW1-NC	2.75	4
DA	S10-SW4-C	S11-SW4-C	2.75	2
DB	S10-SW1-NO	S10-2	3.25	4
DC	S10-2	S10-A	2.25	4
DD	S10-A	S10-B	1.50	4
DE	S10-B	S10-C	2.50	4
DF	S10-C	S10-D	1.50	4
DG	S10-G	S10-1	2.25	3
DH	S10-1	S10-SW2-NO	3.25	3
DJ	S10-SW2-NC	S11-SW2-C	2.75	3
DK	S10-SW1-C	S11-SW1-NC	2.75	4
DL	S10-SW3-C	S11-SW3-NC	2.75	2
DM	S11-SW4-C	S12-SW4-C	2.75	2
DN	S11-SW1-NO	S11-2	3.25	4
DP	S11-2	S11-A	2.25	4
DR	S11-A	S11-B	1.50	4
DS	S11-B	S11-C	2.50	4
DT	S11-C	S11-D	1.50	4
DU	S11-G	S11-1	2.25	3
DV	S11-1	S11-SW2-NO	3.25	3
DW	S11-SW2-NC	S12-SW2-C	2.75	3
DX	S11-SW1-C	S12-SW1-NC	2.75	4
DY	S11-SW3-C	S12-SW3-NC	2.75	2
DZ	S12-SW4-C	S13-SW4-C	2.75	2

JUMPER LIST				
LEAD NO.	FROM	TO	LENGTH	FIND NO
EA	S12-SW4-NO	S12-2	3.25	4
EB	S12-2	S12-A	2.25	4
EC	S12-A	S12-B	1.50	4
ED	S12-B	S12-C	2.50	4
EE	S12-C	S12-D	1.50	4
EF	S12-G	S12-1	2.25	3
EG	S12-1	S12-SW2-NO	3.25	3
EH	S12-SW2-NC	S13-SW2-C	2.75	3
EJ	S12-SW1-C	S13-SW1-NC	2.75	4
EK	S12-SW3-C	S12-SW4-C	1	2
EL	S13-SW4-C	S14-SW4-C	2.75	2
EM	S13-SW1-NO	S13-2	3.25	4
EN	S13-2	S13-A	2.25	4
EP	S13-A	S13-B	1.50	4
ER	S13-B	S13-C	2.50	4
ES	S13-C	S13-D	1.50	4
ET	S13-G	S13-1	2.25	3
EU	S13-1	S13-SW2-NO	3.25	3
EV	S13-SW2-NC	S14-SW2-C	2.75	3
EW	S13-SW1-C	S14-SW1-NC	2.75	4
EX	S14-SW4-C	S15-SW4-C	2.75	2
EY	S14-SW1-NO	S14-2	3.25	4
EZ	S14-2	S14-A	2.25	4
FA	S14-A	S14-B	1.50	4
FB	S14-B	S14-C	2.50	4
FC	S14-C	S14-D	1.50	4
FD	S14-G	S14-1	2.25	3
FE	S14-1	S14-SW2-NO	3.25	3
FF	S14-SW2-NC	S15-1	3.25	3
FG	S14-SW1-C	S15-SW1-NC	2.75	4
FH	S15-SW1-NO	S15-2	3.25	4
FJ	S15-2	S15-A	2.25	4
FK	S15-A	S15-B	1.50	4
FL	S15-B	S15-C	2.50	4
FM	S15-C	S15-D	1.50	4
FN	S15-G	S15-1	2.25	3
FP	S33-1	S33-3	1.50	2
FR	S33-1	S32-3	2.75	2
FS	S17-2	S17-4	1.50	2
FT	XDS1-B	XDS17-B	2.50	4
FU	S16-1	S16-3	1.50	2
FV	S16-3	S19-1	2	2
FW	S19-1	S19-3	1.50	2
FX	S2-2	S3-4	1.75	2
FY	S28-C	S24-C	2.25	2
FZ	S24-C	S20-C	2.25	2
GA	S20-C	S21-C	2.25	2
GB	S21-C	S25-C	2.25	2
GC	S31-C	S27-C	2.25	2
GD	S27-C	S23-C	2.25	2
GE	S22-C	S26-C	2.25	2
GF	S26-C	S30-C	2.25	2
GG	S32-3	S32-1	1.5	2
GH	S23-C	S22-C	2.5	2
GJ	S22-C	S21-C	2.5	2

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. SOLDER PER MIL-S-6872

AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, RED	4
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, BLK	3
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, ORN	2
AR	ND1002181 TYPE I, CL I	WIRE, ELECTRICAL, AWG 22, WHT	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014143	1014309
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
~~MIT APPROVAL~~
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LEAD, ELECTRICAL PROGRAMMER AND MONITOR FRONT PANEL

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020057
SCALE NONE
WT
SHEET 1 OF 1

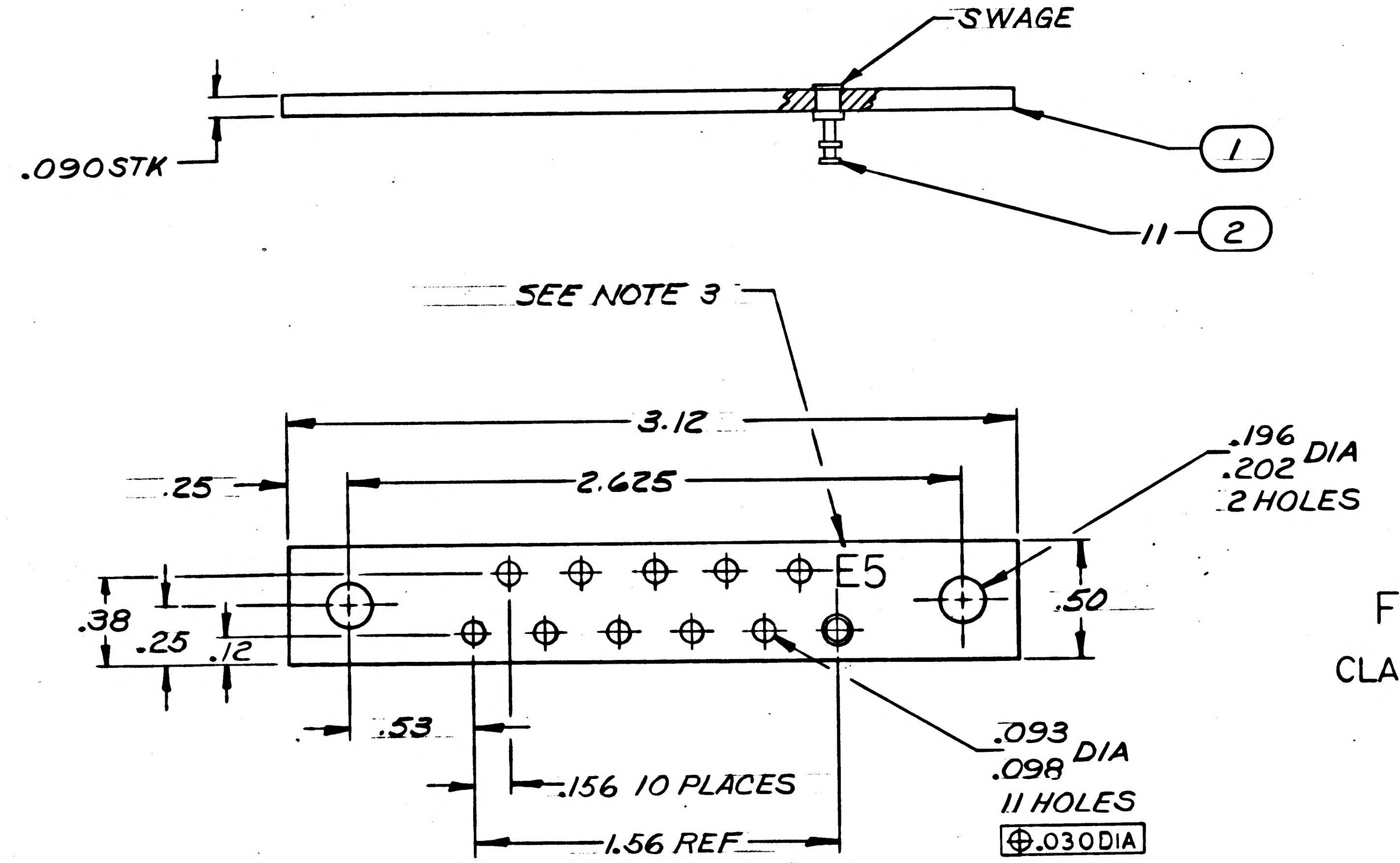
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR		



FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04306 DATE 10/30/63

NOTES

1. MATL: COPPER PER QQ-C-576 LIGHT COLD-ROLLED TEMPER
2. REMOVE BURRS & SHARP EDGES
3. MARK .12 HIGH WHITE CHARACTERS PER ND1002019
4. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
5. DIMENSIONS LOCATING THE TRUE POSITION ARE BASIC
6. INDENTIFY PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
11	MS17122-10	TERMINAL, STUD	2
1	1020061-1	STRIP, GROUNDING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014180	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE

HEAT TREATMENT

FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS9-498

DRAWN DATE 17 SEP 63
CHECKED 5 Oct 63
APPROVAL
APPROVAL
APPROVAL 12/4/63
NASA APPROVAL 10/30/63
MIT APPROVAL W Kupfer 30 Oct 63
MIT APPROVAL 12/4/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

GROUNDING STRIP ASSY
SYSTEM INTERFACE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1020061

SCALE 2/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020061

MASTER

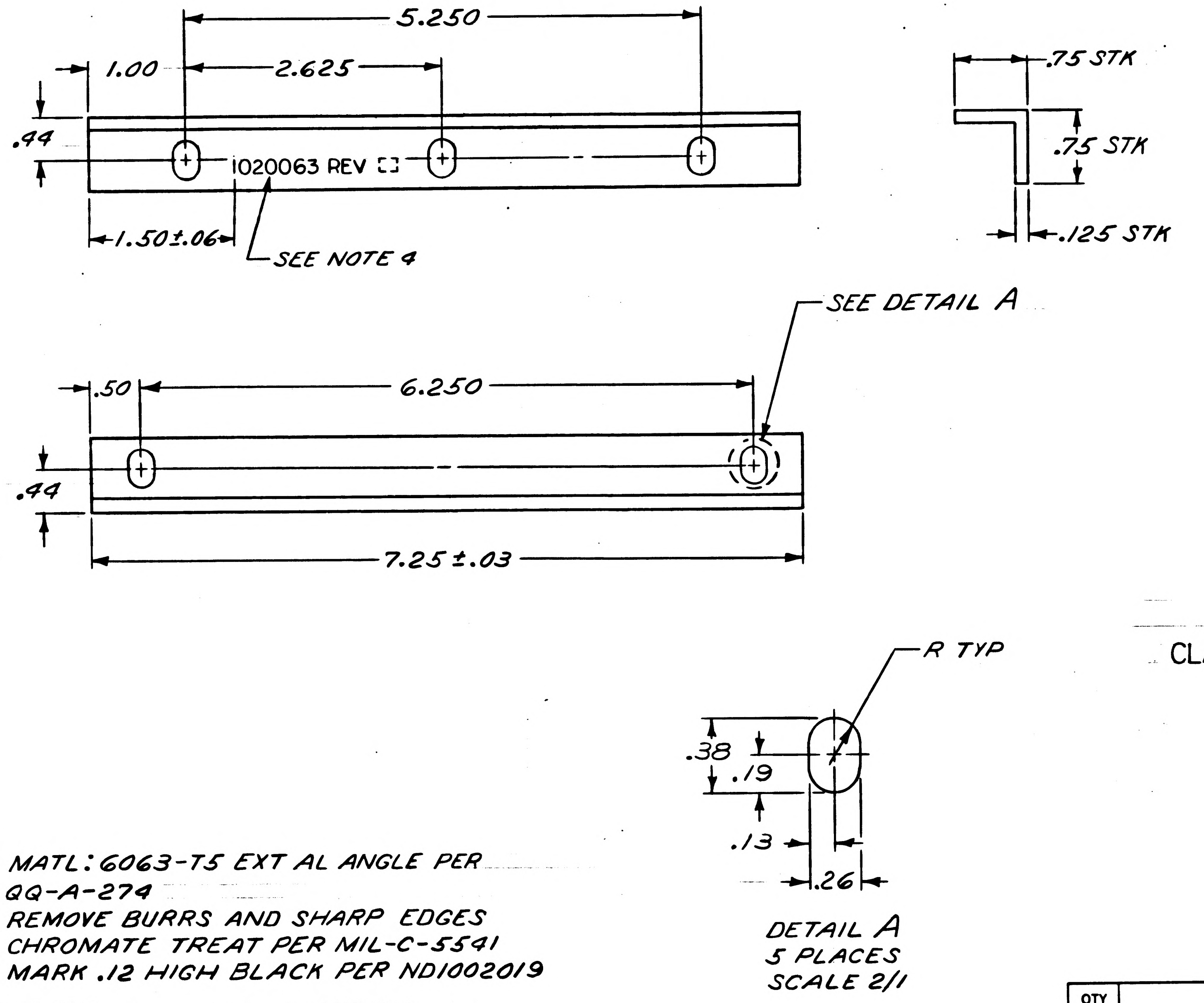
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR NO. 03835	10/10/63	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 03835 DATE 10/11/63

NOTES
1. MATL: 6063-T5 EXT AL ANGLE PER QQ-A-274
2. REMOVE BURRS AND SHARP EDGES
3. CHROMATE TREAT PER MIL-C-5541
4. MARK .12 HIGH BLACK PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014309	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN L. Hyster DATE 18SEP63
CHECKED R. D. Fagan 20 SEP 63
APPROVAL C. Sperling 30 Sept 63
APPROVAL J. Gabriel 11/8/9/30/63
APPROVAL C. J. Poundstone, R.F.B. 9/30/63
NASA APPROVAL J. Bernard
MIT APPROVAL W. Kupfer 10 Oct 63
MIT APPROVAL Dennis M. Scolamiero 11/9/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, ANGLE
PROGRAMMER AND MONITOR

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020063
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

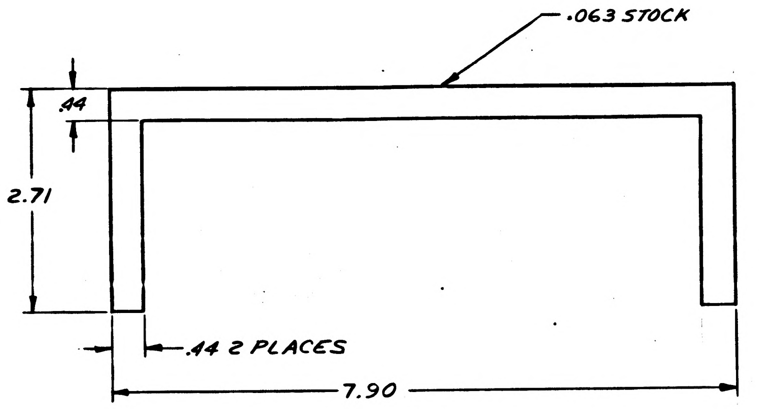
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

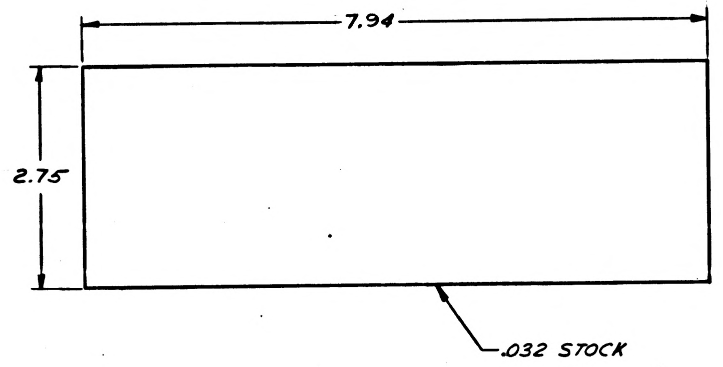
REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 04137	10/24/63	[illegible]



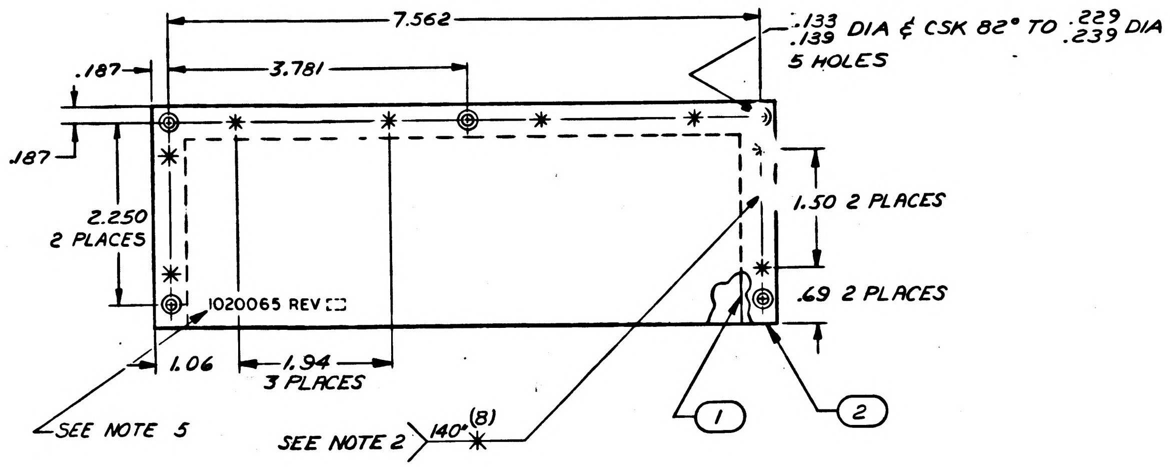
NOTES:
1. MAT'L: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES
3. SCALE: 1/1

PAD, COVER
1020065-1



NOTES:
1. MAT'L: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES
3. SCALE: 1/1

COVER
1020065-2



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 04137 DATE 10/24/63

NOTES:
1. REMOVE BURRS & SHARP EDGES
2. WELD PER MIL-W-6858
3. CHROMATE TREAT PER MIL-C-5541
4. PAINT FRONT AND EDGES, 1 COAT TT-E-529 CLASS B FED-STD-595 COLOR NO. 26440 PER MIL-F-14072 P513 TYPE II AFTER COVERING HOLES
5. MARK .12 HIGH BLACK PER ND 1002019

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1020065-2	COVER	2
1	1020065-1	PAD, COVER	1

NEXT ASSY	USED ON
1014468	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .02 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH SEE NOTES

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 18SEP63
CHECKED A.J. Marinan 30SEP63
APPROVAL R. Morse 19OCT63
APPROVAL [illegible] 10/14/63
APPROVAL [illegible] 10/4/63
NASA APPROVAL [illegible] 10/24/63
MIT APPROVAL [illegible] 24OCT63
MIT APPROVAL [illegible] 10/22/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, HYDRAULIC TUBING

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020065
SCALE 1/1 WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

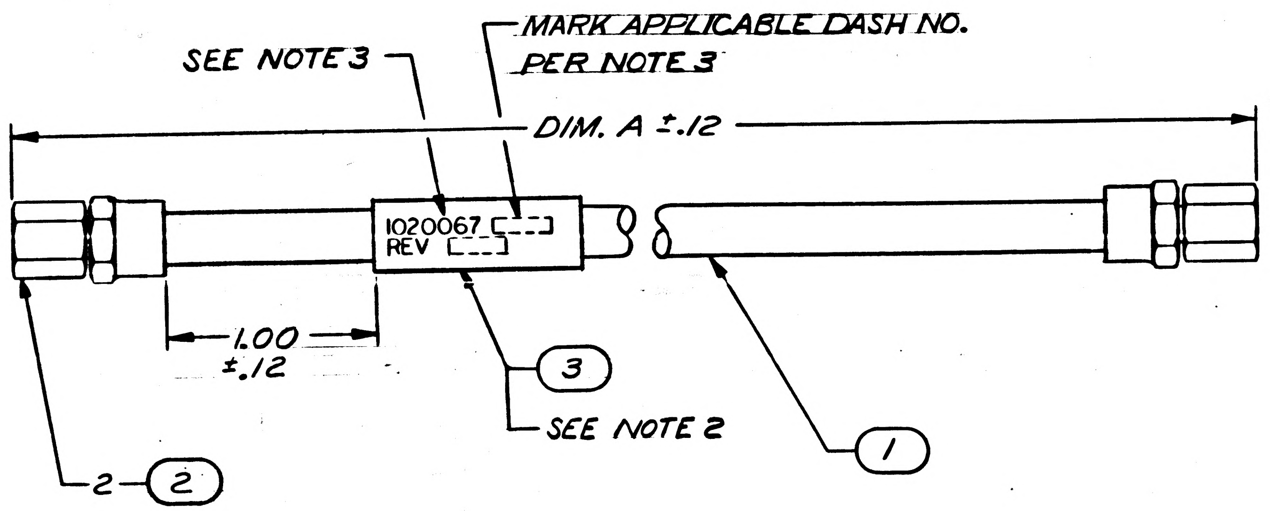
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



REV STATUS OF ASSY		DIM. A
PART NO.	REV SYMBOL	
1020067-1	—	13.00
1020067-2	—	27.00

NOTES

1. ASSEMBLY AND TEST FIND NO. 1 AND 2 PER AN773 AND MIL-H-5593
2. BOND FIND NO. 3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
3. MARK .12 HIGH BLK CHARACTERS PER ND1002019
4. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04397 DATE 11/5/63

QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1	1014472-2A	BAND MARKER, CABLE	3
2	2	AN773-4	FITTING ASSEMBLY	2
A/R	A/R	1006688	HOSE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020001	1020018

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 22 SEP 63
CHECKED W. J. Gifford 3 OCT 63
APPROVAL H. Morse 28 OCT 63
APPROVAL 28 OCT 63
APPROVAL J. J. Rumbletone 10/30/63
NASA APPROVAL 11-5-63
MIT APPROVAL 5 Nov 63
MIT APPROVAL 11/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

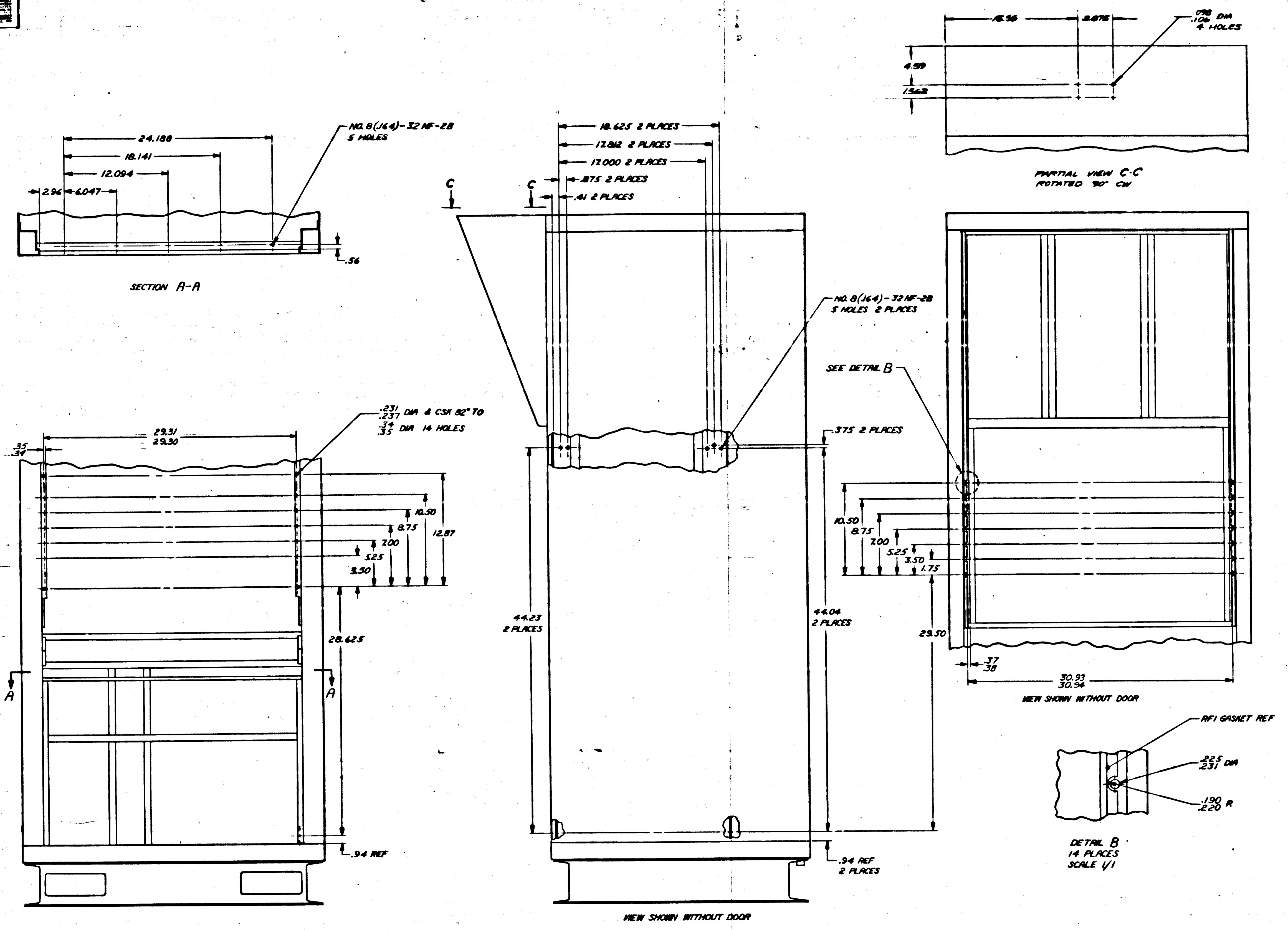
HOSE ASSEMBLY,
HYDRAULIC

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020067
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CLASS II CHANGE PER RDR5630 DR CHK APPD		
B	CHANGED PER TDRR NO 06674 DR CHK J-J APPD		


NO. 8(.164)-32 NF-2B
5 HOLES
24.188
18.141
12.094
2.96
6.047
.56
SECTION A-A
C
C
18.625 2 PLACES
17.812 2 PLACES
17.000 2 PLACES
.875 2 PLACES
.41 2 PLACES
NO. 8(.164)-32 NF-2B
5 HOLES 2 PLACES
SEE DETAIL B
.375 2 PLACES
44.23
2 PLACES
44.04
2 PLACES
.94 REF
2 PLACES
VIEW SHOWN WITHOUT DOOR
.231
.237 DIA & CSK 82° TO
.34
.35 DIA 14 HOLES
29.31
29.30
.35
.34
10.50
8.75
12.87
7.00
5.25
3.50
28.625
A
A
.94 REF
18.56
2.875
.098
.106 DIA
4 HOLES
4.59
1.562
PARTIAL VIEW C-C
ROTATED 90° CW
10.50
8.75
7.00
5.25
3.50
1.75
29.50
.37
.38
30.93
30.94
VIEW SHOWN WITHOUT DOOR
RFI GASKET REF
.225
.231 DIA
.190
.220 R
DETAIL B
14 PLACES
SCALE 1/1

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

NOTES

1. REWORK PART NO. 1006724 AS SHOWN
2. REMOVE BURRS AND SHARP EDGES
3. TOUCH-UP ALL SURFACES MACHINED USING ZINC DUST PIGMENTED PRIMER COATING IN ACCORDANCE WITH MIL-P-26915 TYPE I

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .005 .02 ANGLES ± 0°30'
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

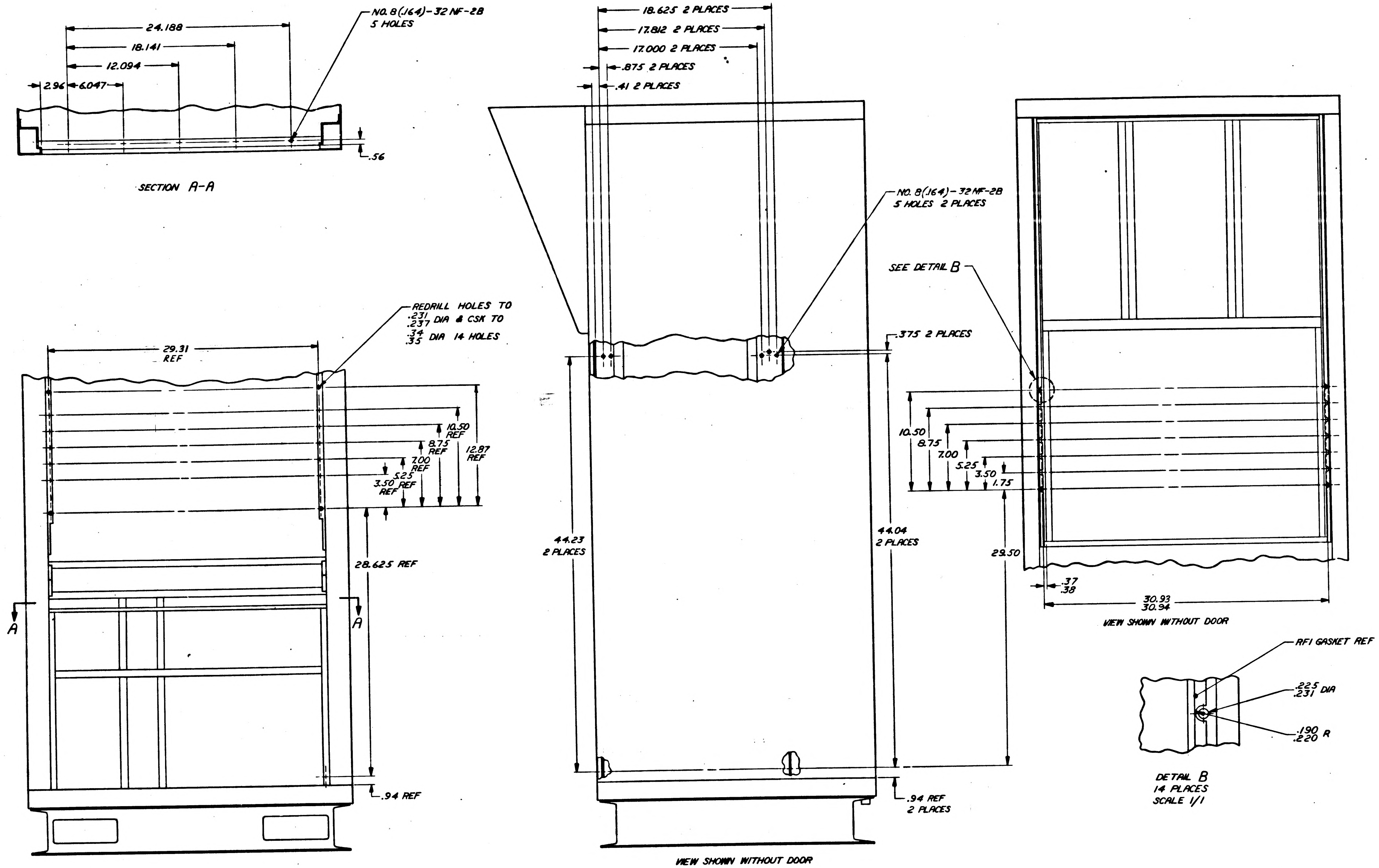
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET,
ELECTRICAL EQUIPMENT
REWORK

CODE IDENT NO. — SIZE J NASA DRAWING NO 1020070
SCALE 1/4 WT SHEET 1 OF 1

1020070

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



24.188
18.141
12.094
2.96
6.047
NO. 8(.164)-32 NF-2B
5 HOLES
.56
SECTION A-A
18.625 2 PLACES
17.812 2 PLACES
17.000 2 PLACES
.875 2 PLACES
.41 2 PLACES
NO. 8(.164)-32 NF-2B
5 HOLES 2 PLACES
SEE DETAIL B
REDRILL HOLES TO
.231
.237 DIA & CSK TO
.34
.35 DIA 14 HOLES
29.31
REF
10.50
REF
8.75
REF
7.00
REF
5.25
3.50 REF
REF
12.87
REF
28.625 REF
A
A
.94 REF
.375 2 PLACES
44.23
2 PLACES
44.04
2 PLACES
.94 REF
2 PLACES
VIEW SHOWN WITHOUT DOOR
10.50
8.75
7.00
5.25
3.50
1.75
29.50
.37
.38
30.93
30.94
VIEW SHOWN WITHOUT DOOR
RFI GASKET REF
.225
.231 DIA
.190
.220 R
DETAIL B
14 PLACES
SCALE 1/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

NOTES

1. REWORK PART NO. 1006724 AS SHOWN
2. REMOVE BURRS AND SHARP EDGES
3. TOUCH-UP ALL SURFACES MACHINED USING ZINC DUST PIGMENTED PRIMER COATING IN ACCORDANCE WITH MIL-P-26915 TYPE I

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 .02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN BJ Tesia DATE 1 Oct 63
CHECKED A.J. Pomago 18 Oct 63
APPROVAL PK
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 30 Oct 63
MIT APPROVAL 10/30/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET,
ELECTRICAL EQUIPMENT
REWORK

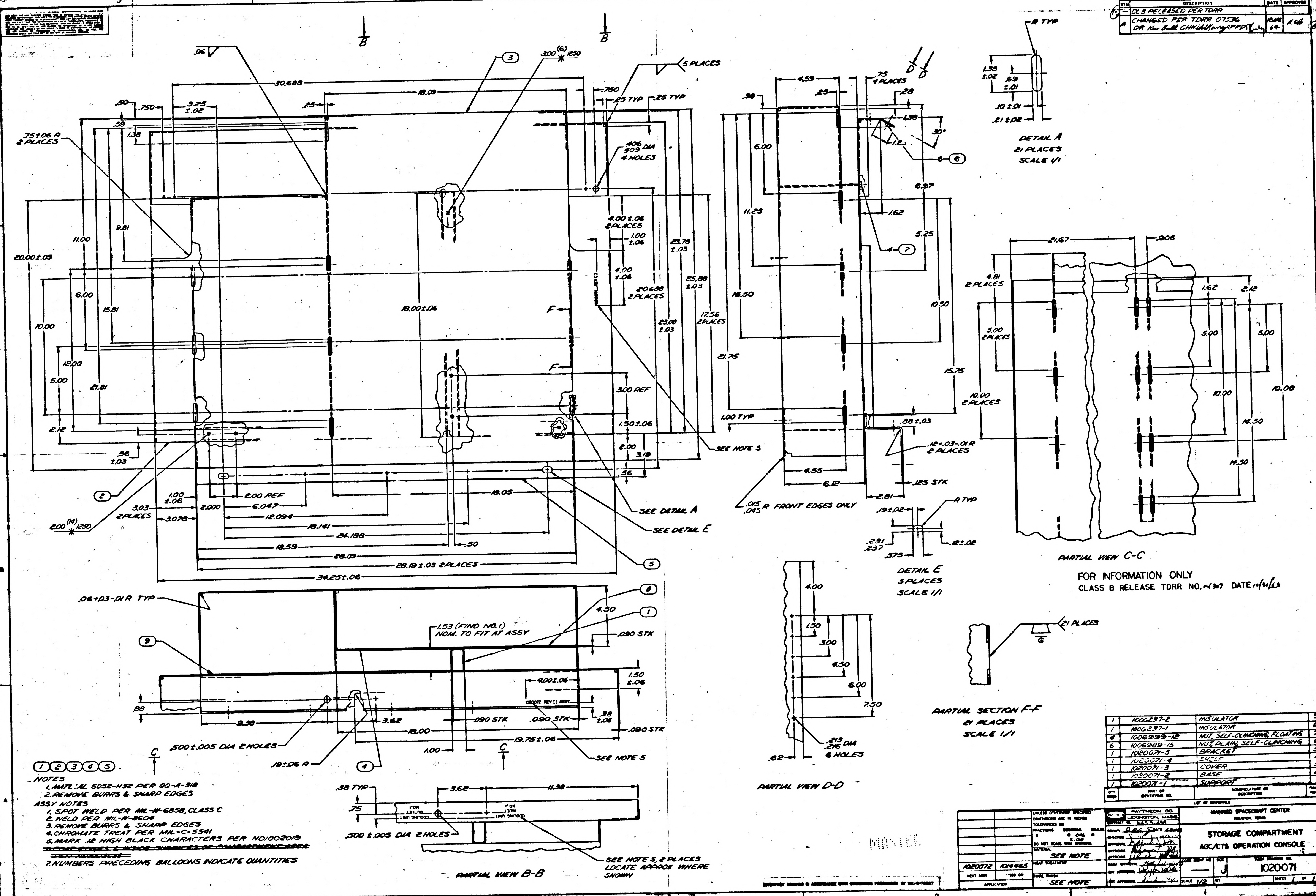
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020070
SCALE 1/4
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020070

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07536 DR. Ken Bull CHK Koenig APPD	64	KEB



B
B
DETAIL A
21 PLACES
SCALE 1/1
R TYP
DETAIL E
5 PLACES
SCALE 1/1
PARTIAL VIEW C-C
PARTIAL VIEW D-D
PARTIAL SECTION F-F
21 PLACES
SCALE 1/1
PARTIAL VIEW B-B
SEE DETAIL A
SEE DETAIL E
SEE NOTE 5
.015 R FRONT EDGES ONLY
.045
.406 DIA
.409
4 HOLES
.500±.005 DIA 2 HOLES
.19±.06 R
.06+.03-.01 R TYP
1.53 (FIND NO.1)
NOM. TO FIT AT ASSY
SEE NOTE 5, 2 PLACES
LOCATE APPROX WHERE
SHOWN
COOLING UNIT INLET NO.1
COOLING UNIT OUTLET NO.1
.213 DIA
.216
6 HOLES
34.25±.06
28.19±.03 2 PLACES
18.00±.06
.090 STK
.125 STK
C
C
F
F
D
D

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 01307 DATE 10/31/63

MASTER

①②③④⑤.

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES

ASSY NOTES
1. SPOT WELD PER MIL-W-6858, CLASS C
2. WELD PER MIL-W-8604
3. REMOVE BURRS & SHARP EDGES
4. CHROMATE TREAT PER MIL-C-5541
5. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
~~6. COAT EDGES & INSIDE SURFACES OF COMPARTMENT AREA~~
~~PER ND1002035~~
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	1006237-2	INSULATOR	9
1	1006237-1	INSULATOR	8
4	1006999-12	NUT, SELF-CLINCHING, FLOATING	7
6	1006989-15	NUT, PLAIN, SELF-CLINCHING	6
1	1020071-5	BRACKET	5
1	1020071-4	SHELF	4
1	1020071-3	COVER	3
1	1020071-2	BASE	2
1	1020071-1	SUPPORT	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020072	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

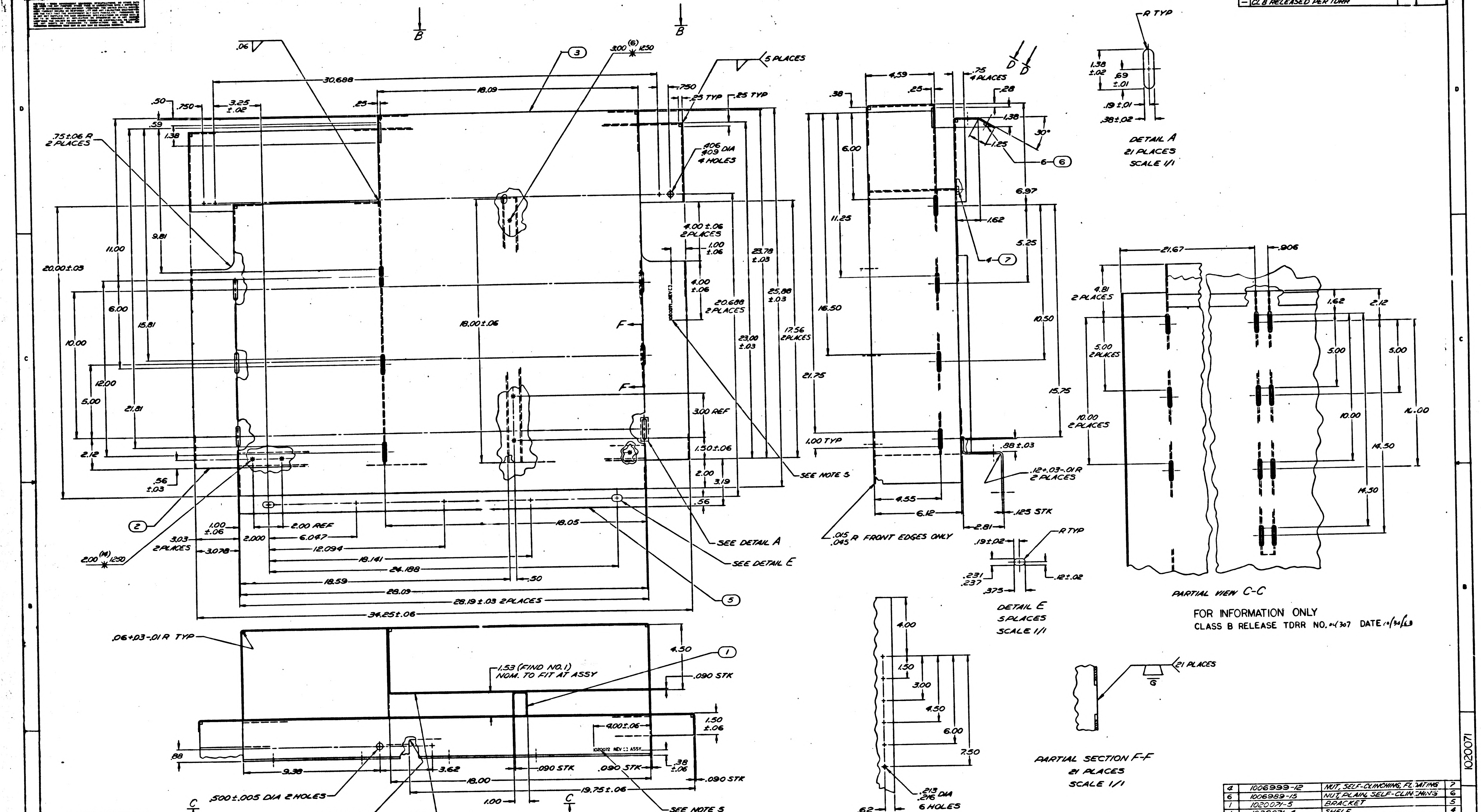
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STORAGE COMPARTMENT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020071
SCALE 1/2
WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

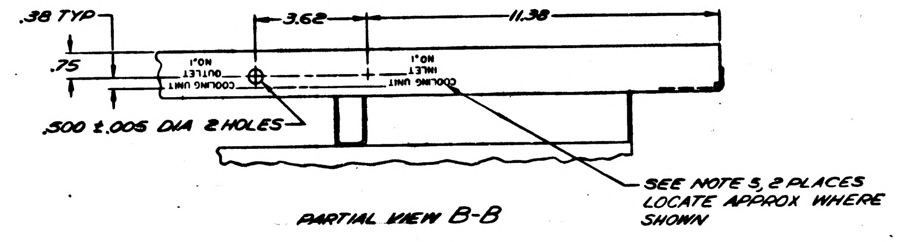

B
B
.06
3
3.00 (6) 1250
5 PLACES
30.688
18.09
.750
.25 TYP
.25 TYP
.50
.750
3.25 ±.02
.25
.59
1.38
.75±.06 R 2 PLACES
.406 .409 DIA 4 HOLES
4.00 ±.06 2 PLACES
1.00 ±.06
4.00 ±.06
20.688 2 PLACES
23.78 ±.03
25.88 ±.03
17.56 2 PLACES
23.00 ±.03
20.00±.03
11.00
9.81
6.00
15.81
10.00
12.00
5.00
21.81
2.12
.56 ±.03
18.00±.06
F
F
3.00 REF
1.50±.06
2.00
3.19
.56
SEE NOTE 5
SEE DETAIL A
SEE DETAIL E
2
1.00 ±.06
2.00 REF
3.03 2 PLACES
2.000
6.047
3.078
12.094
18.141
24.188
18.05
2.00 (14) 1250
18.59
.50
28.09
28.19 ±.03 2 PLACES
34.25±.06
5
4.59
.75 4 PLACES
.38
.25
.28
1.38
30°
1.25
6
6.00
6.97
11.25
1.62
7
5.25
16.50
10.50
21.75
15.75
1.00 TYP
.88 ±.03
.12+.03-.01 R 2 PLACES
4.55
6.12
.125 STK
2.81
.015 .045 R FRONT EDGES ONLY
D
D
R TYP
1.38 ±.02
.69 ±.01
.19 ±.01
.38±.02
DETAIL A
21 PLACES
SCALE 1/1
.19±.02
R TYP
.231 .237
.375
.12±.02
DETAIL E
5 PLACES
SCALE 1/1
21.67
.906
4.81 2 PLACES
1.62
2.12
5.00 2 PLACES
5.00
5.00
10.00 2 PLACES
10.00
14.50
14.50
16.00
PARTIAL VIEW C-C
4.00
1.50
3.00
4.50
6.00
7.50
.213 .216 DIA 6 HOLES
.62
PARTIAL VIEW D-D
21 PLACES
G
PARTIAL SECTION F-F
21 PLACES
SCALE 1/1
.06+.03-.01 R TYP
4.50
1
1.53 (FIND NO. 1) NOM. TO FIT AT ASSY
.090 STK
1.50 ±.06
9.00±.06
1020072 REV ☐ ASSY
.88
9.38
3.62
18.00
.090 STK
.090 STK
.38 ±.06
.090 STK
19.75±.06
1.00
.500±.005 DIA 2 HOLES
.19±.06 R
4
C
C
SEE NOTE 5

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04307 DATE 10/30/63

①②③④⑤

NOTES
1. MATL: AL 5052-H32 PER QQ-A-318
2. REMOVE BURRS & SHARP EDGES

ASSY NOTES
1. SPOT WELD PER MIL-W-6858, CLASS C
2. WELD PER MIL-W-8604
3. REMOVE BURRS & SHARP EDGES
4. CHROMATE TREAT PER MIL-C-5541
5. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
6. COAT EDGES & INSIDE SURFACES OF COMPARTMENT AREA PER ND1002035
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES


.38 TYP
3.62
11.38
.75
COOLING UNIT OUTLET NO. 1
COOLING UNIT INLET NO. 1
.500 ±.005 DIA 2 HOLES
SEE NOTE 5, 2 PLACES LOCATE APPROX WHERE SHOWN

PARTIAL VIEW B-B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
4	1006999-12	NUT, SELF-CLINCHING, FLOATING	7
6	1006989-15	NUT, PLAIN, SELF-CLINCHING	6
1	1020071-5	BRACKET	5
1	1020071-4	SHELF	4
1	1020071-3	COVER	3
1	1020071-2	BASE	2
1	1020071-1	SUPPORT	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020072	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.016 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN D. B. DATE 4 Oct 63
CHECKED 14 Oct 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL W. Kupfer 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

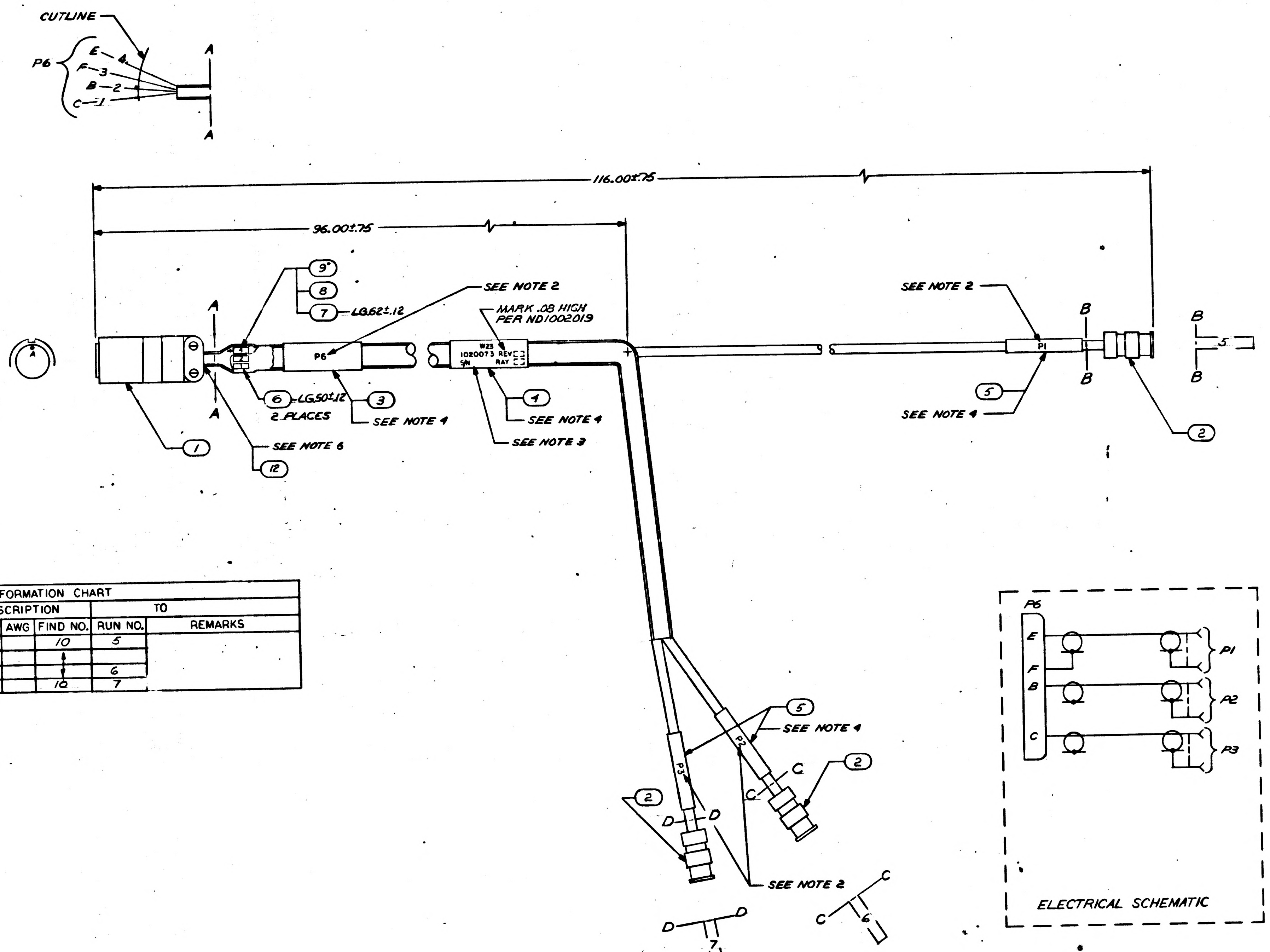
STORAGE COMPARTMENT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020071
SCALE 1/2 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


CUTLINE
P6
E—4
F—3
B—2
C—1
A
A
116.00±.75
96.00±.75
9
8
7 LG.62±.12
SEE NOTE 2
MARK .08 HIGH PER ND1002019
A
A
P6
W23 1020073 REV RAY S/N
6 LG.50±.12 2 PLACES
3 SEE NOTE 4
4 SEE NOTE 4
SEE NOTE 3
1
SEE NOTE 6
12
SEE NOTE 2
P1
B
B
5 SEE NOTE 4
2
B
B
5
5 SEE NOTE 4
P3
P2
2
C
C
2
D
D
SEE NOTE 2
D
D
7
C
C
6
P6
E
F
B
C
P1
P2
P3

ELECTRICAL SCHEMATIC

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.		AWG	FIND NO.	RUN NO.	REMARKS
	4	COAX		10	5	
ATTACH FIND NO.11 LG2.5	3	SHIELD		↕		
	2	COAX			6	
	1	COAX		10	7	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NOS. 3, 4 AND 5 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-23053 CLASS I COLOR BLACK FOR FIND NO. 6 SIZE NO. 6, FOR FIND NO. 7 SIZE NO. 4
6. APPLY DOUBLE WRAP OF FIND NO. 12 UNDER CLAMP

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006692	TAPE, PRESSURE SENITIVE ADHESIVE	12
2.5	MIL-W-16878/4, E22	WIRE, ELECTRICAL BLK	11
* 28.0	MIL-C-17/28	CABLE, COAXIAL	10
1	1000242-14	FERRULE, ELEC CONDUCTOR	9
1	1000243-11	FERRULE, ELEC CONDUCTOR	8
.62	SEE NOTE 5	SLEEVING	7
2.0	SEE NOTE 5	SLEEVING	6
3	1014472-19A	BAND MARKER, CABLE	5
1	1014472-1	BAND MARKER, CABLE	4
1	1014472-1A	BAND MARKER, CABLE	3
3	MS35168-88E	CONNECTOR	2
1	MS3126F-12-10P	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1019217	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

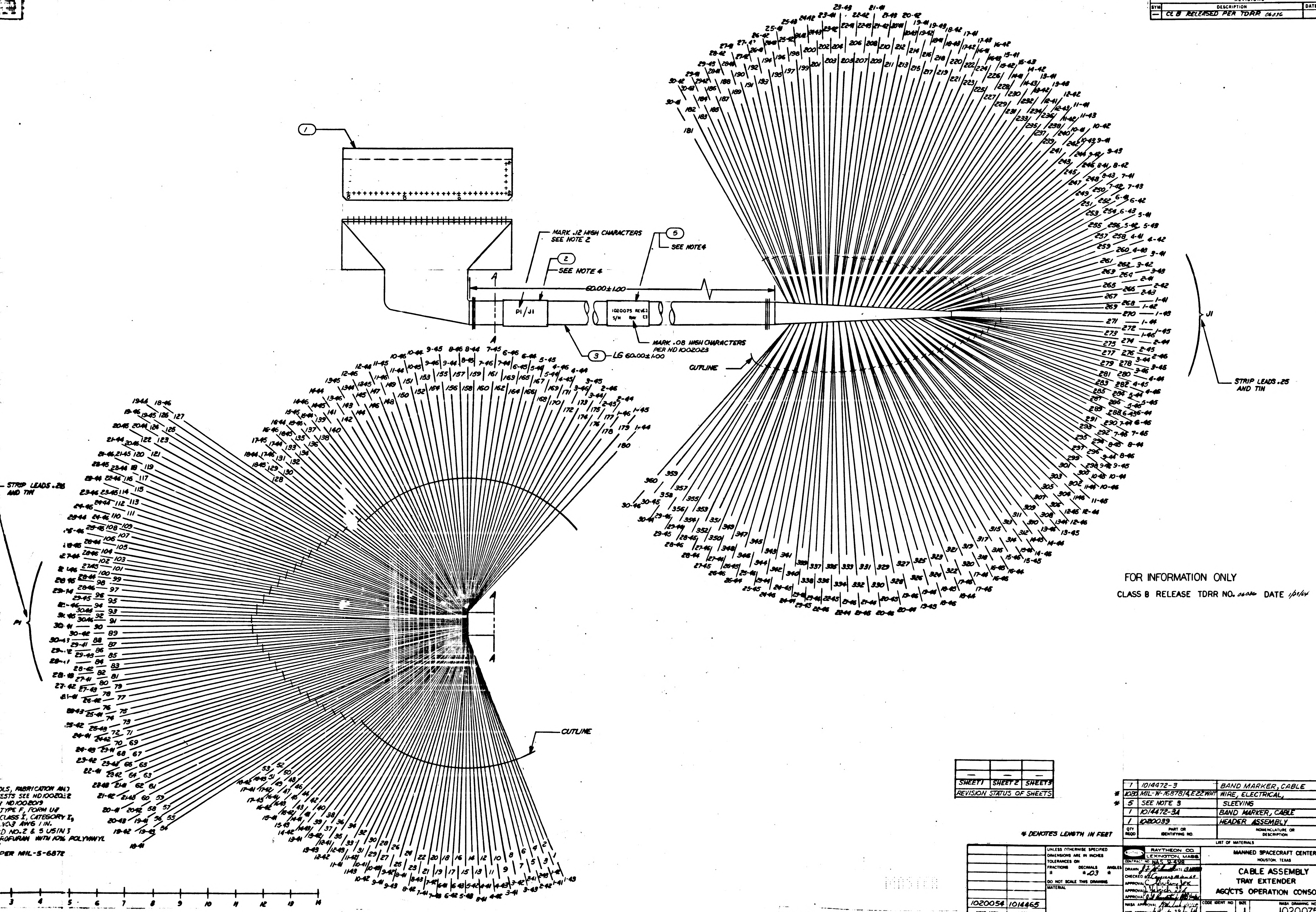
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P.S. Dray DATE
CHECKED 31 Dec 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CABLE
W23
CALIBRATION SYSTEM

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020073
SCALE 1/1 WT SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		


①
MARK .12 HIGH CHARACTERS SEE NOTE 2
② SEE NOTE 4
⑤ SEE NOTE 4
60.00±1.00
P1/J1
1020075 REV [ ] S/N RAY [ ]
MARK .08 HIGH CHARACTERS PER ND1002023
③ LG 60.00±1.00
A
A
CUTLINE
J1
STRIP LEADS .25 AND TIN
STRIP LEADS .25 AND TIN
P1
CUTLINE

OLS, FABRICATION AND
ESTS SEE ND1002022
ND1002019
TYPE F, FORM U8
CLASS I, CATEGORY I,
.VO3 AWG 1 IN.
D NO. 2 & 5 USING
ROFURAN WITH 10% POLYVINYL

PER MIL-S-6872

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

—	—	—
SHEET 1	SHEET 2	SHEET 3
REVISION STATUS OF SHEETS		

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	7	1014472-3	BAND MARKER, CABLE	5
*	1080	MIL-W-16878/4,E22WHT	WIRE, ELECTRICAL,	4
*	5	SEE NOTE 3	SLEEVING	3
	1	1014472-3A	BAND MARKER, CABLE	2
	1	1020039	HEADER ASSEMBLY	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020054	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J.F. McC... DATE 13 [illegible]
CHECKED A. Caggiano
APPROVAL C. ... JK
APPROVAL J. Yarich
APPROVAL
NASA APPROVAL
MIT APPROVAL ... 29 Jan 64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

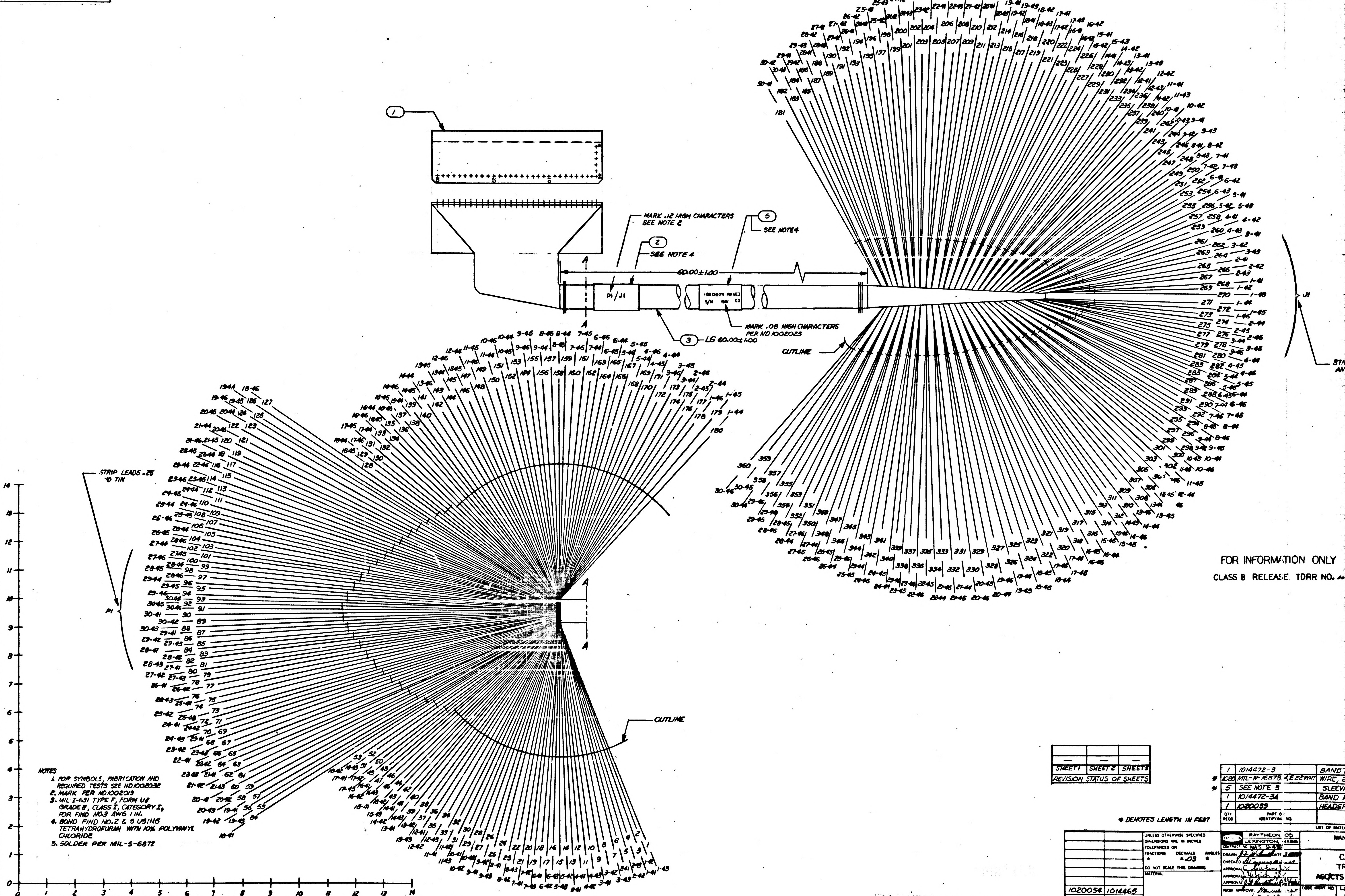
CABLE ASSEMBLY
TRAY EXTENDER
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020075
SCALE 1/1
WT
SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM		DESCRIPTION
—	CL B	RELEASED PER T



1
MARK .12 HIGH CHARACTERS SEE NOTE 2
2
SEE NOTE 4
5
SEE NOTE4
60.00±1.00
P1/J1
1020075 REV C3
S/N RAY C3
MARK .08 HIGH CHARACTERS PER ND 1002023
3
LG 60.00±1.00
A
A
OUTLINE
J1
STRIP LEADS .25 TO TIN
P1
OUTLINE

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO.

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. MARK PER ND1002019
3. MIL-I-631 TYPE F, FORM U2 GRADE A, CLASS I, CATEGORY I, FOR FIND NO.3 AWG 1 IN.
4. BOND FIND NO.2 & 5 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. SOLDER PER MIL-S-6872

—	—	—
SHEET1	SHEET2	SHEET3
REVISION STATUS OF SHEETS		

	QTY REQD	PART OR IDENTIFYING NO.	
	1	1014472-3	BAND T
*	1080	MIL-W-16878/4 E22WHT	WIRE, E
*	5	SEE NOTE 3	SLEEVI
	1	1014472-3A	BAND
	1	1020039	HEADER

LIST OF MATER

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020054	1014465
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-4
DRAWN J J Ch DATE 3
CHECKED A Capp
APPROVAL C. Irving
APPROVAL J. Yesich
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MAN

CA
TR
ASC/CTS

CODE IDENT NO —
SCALE 1/1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1050012

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR 06036		

ASSEMBLY INFORMATION CHART

		DESCRIPTION				
REMARKS	RUN NO	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	178	WHT	22	4	273	
	179				272	
	180				271	
	1				270	
	2				269	
	3				268	
	175				276	
	176				275	
	177				274	
	4				267	
	5				266	
	6				265	
	172				279	
	173				278	
	174				277	
	7				264	
	8				263	
	9				262	
	169				282	
	170				281	
	171				280	
	10				261	
	11				260	
	12				259	
	166				285	
	167				284	
	168				283	
	13				258	
	14				257	
	15				256	
	163				288	
	164				287	
	165				286	
	16				255	
	17				254	
	18				253	
	160				291	
	161				290	
	162				289	
	19				252	
	20				251	
	21				250	
	157				294	
	158				293	
	159				292	
	22				249	
	23				248	
	24				247	
	154				297	
	155				296	
	156				295	
	25				246	
	26				245	
	27				244	
	151				300	
	152				299	
	153				298	
	28				243	
	29				242	
	30	WHT	22	4	241	

ASSEMBLY INFORMATION CHART

		DESCRIPTION				
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	148	WHT	22	4	303	
	149				302	
	150				301	
	31				240	
	32				239	
	33				238	
	145				306	
	146				305	
	147				304	
	34				237	
	35				236	
	36				235	
	142				309	
	143				308	
	144				307	
	37				234	
	38				233	
	39				232	
	139				312	
	140				311	
	141				310	
	40				231	
	41				230	
	42				229	
	136				315	
	137				314	
	138				313	
	43				228	
	44				227	
	45				226	
	133				318	
	134				317	
	135				316	
	46				225	
	47				224	
	48				223	
	130				321	
	131				320	
	132				319	
	49				222	
	50				221	
	51				220	
	127				324	
	128				323	
	129				322	
	52				219	
	53				218	
	54				217	
	124				327	
	125				326	
	126				325	
	55				216	
	56				215	
	57				214	
	121				330	
	122				329	
	123				328	
	58				213	
	59				212	
	60	WHT	22	4	211	

ASSEMBLY INFORMATION CHART

		DESCRIPTION				
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	118	WHT	22	4	333	
	119				332	
	120				331	
	61				210	
	62				209	
	63				208	
	115				336	
	116				335	
	117				334	
	64				207	
	65				206	
	66				205	
	112				339	
	113				338	
	114				337	
	67				204	
	68				203	
	69				202	
	109				342	
	110				341	
	111				340	
	70				201	
	71				200	
	72				199	
	106				345	
	107				344	
	108				343	
	73				198	
	74				197	
	75				196	
	103				348	
	104				347	
	105				346	
	76				195	
	77				194	
	78				193	
	100				351	
	101				350	
	102				349	
	79				192	
	80				191	
	81				190	
	97				354	
	98				353	
	99				352	
	82				189	
	83				188	
	84				187	
	94				357	
	95				356	
	96				355	
	85				186	
	86				185	
	87				184	
	91				360	
	92				359	
	93				358	
	88				183	
	89				182	
	90	WHT	22	4	181	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE [illegible]

1020075

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1020054	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

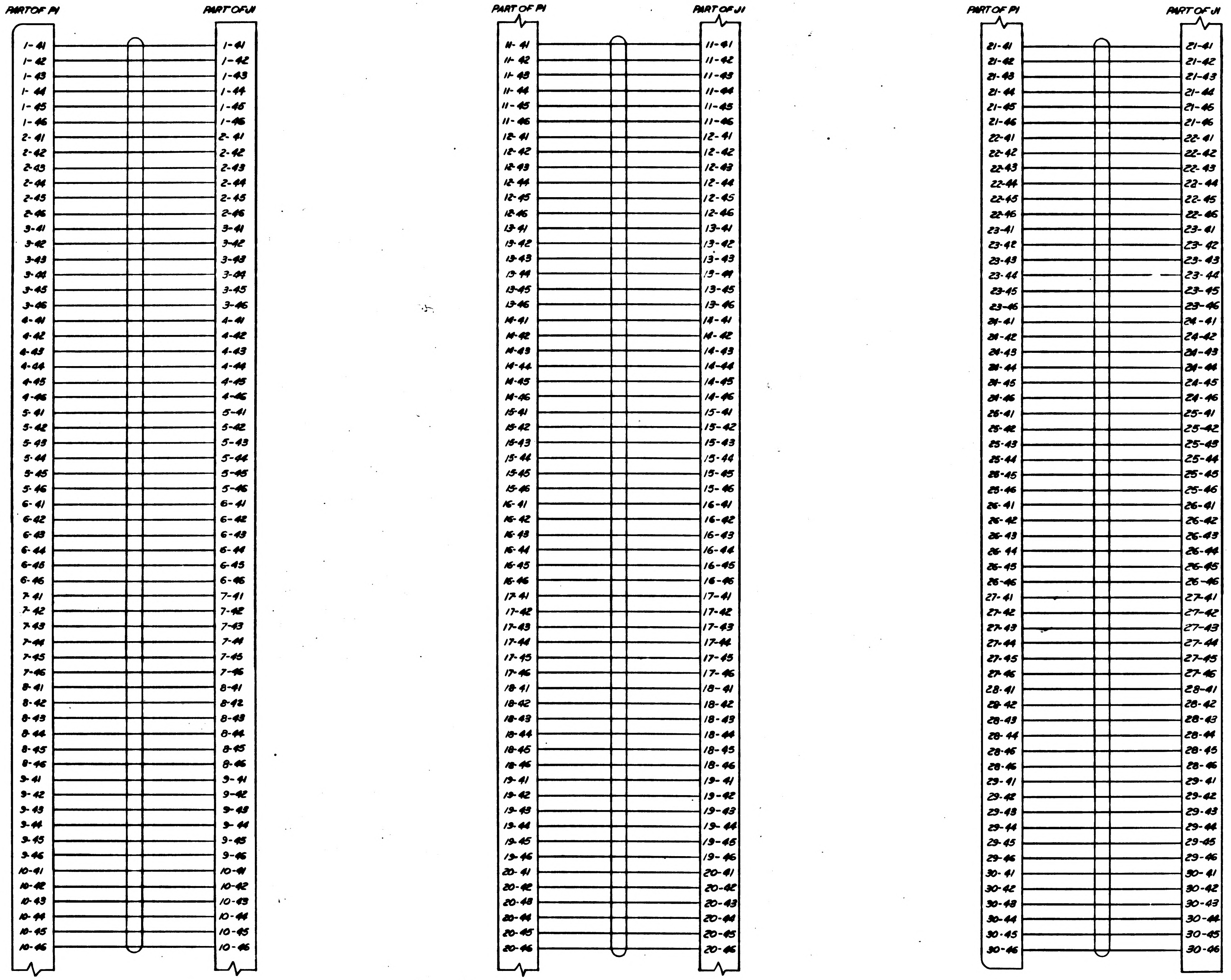
CABLE ASSEMBLY
TRAY EXTENDER
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020075
SCALE NONE
WT
SHEET 2 OF 3

1020075

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		


PART OF P1
PART OF J1
1-41
1-42
1-43
1-44
1-45
1-46
2-41
2-42
2-43
2-44
2-45
2-46
3-41
3-42
3-43
3-44
3-45
3-46
4-41
4-42
4-43
4-44
4-45
4-46
5-41
5-42
5-43
5-44
5-45
5-46
6-41
6-42
6-43
6-44
6-45
6-46
7-41
7-42
7-43
7-44
7-45
7-46
8-41
8-42
8-43
8-44
8-45
8-46
9-41
9-42
9-43
9-44
9-45
9-46
10-41
10-42
10-43
10-44
10-45
10-46
1-41
1-42
1-43
1-44
1-45
1-46
2-41
2-42
2-43
2-44
2-45
2-46
3-41
3-42
3-43
3-44
3-45
3-46
4-41
4-42
4-43
4-44
4-45
4-46
5-41
5-42
5-43
5-44
5-45
5-46
6-41
6-42
6-43
6-44
6-45
6-46
7-41
7-42
7-43
7-44
7-45
7-46
8-41
8-42
8-43
8-44
8-45
8-46
9-41
9-42
9-43
9-44
9-45
9-46
10-41
10-42
10-43
10-44
10-45
10-46
PART OF P1
PART OF J1
11-41
11-42
11-43
11-44
11-45
11-46
12-41
12-42
12-43
12-44
12-45
12-46
13-41
13-42
13-43
13-44
13-45
13-46
14-41
14-42
14-43
14-44
14-45
14-46
15-41
15-42
15-43
15-44
15-45
15-46
16-41
16-42
16-43
16-44
16-45
16-46
17-41
17-42
17-43
17-44
17-45
17-46
18-41
18-42
18-43
18-44
18-45
18-46
19-41
19-42
19-43
19-44
19-45
19-46
20-41
20-42
20-43
20-44
20-45
20-46
11-41
11-42
11-43
11-44
11-45
11-46
12-41
12-42
12-43
12-44
12-45
12-46
13-41
13-42
13-43
13-44
13-45
13-46
14-41
14-42
14-43
14-44
14-45
14-46
15-41
15-42
15-43
15-44
15-45
15-46
16-41
16-42
16-43
16-44
16-45
16-46
17-41
17-42
17-43
17-44
17-45
17-46
18-41
18-42
18-43
18-44
18-45
18-46
19-41
19-42
19-43
19-44
19-45
19-46
20-41
20-42
20-43
20-44
20-45
20-46
PART OF P1
PART OF J1
21-41
21-42
21-43
21-44
21-45
21-46
22-41
22-42
22-43
22-44
22-45
22-46
23-41
23-42
23-43
23-44
23-45
23-46
24-41
24-42
24-43
24-44
24-45
24-46
25-41
25-42
25-43
25-44
25-45
25-46
26-41
26-42
26-43
26-44
26-45
26-46
27-41
27-42
27-43
27-44
27-45
27-46
28-41
28-42
28-43
28-44
28-45
28-46
29-41
29-42
29-43
29-44
29-45
29-46
30-41
30-42
30-43
30-44
30-45
30-46
21-41
21-42
21-43
21-44
21-45
21-46
22-41
22-42
22-43
22-44
22-45
22-46
23-41
23-42
23-43
23-44
23-45
23-46
24-41
24-42
24-43
24-44
24-45
24-46
25-41
25-42
25-43
25-44
25-45
25-46
26-41
26-42
26-43
26-44
26-45
26-46
27-41
27-42
27-43
27-44
27-45
27-46
28-41
28-42
28-43
28-44
28-45
28-46
29-41
29-42
29-43
29-44
29-45
29-46
30-41
30-42
30-43
30-44
30-45
30-46

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

ELECTRICAL SCHEMATIC

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1020054	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN J. F. McDonald DATE
CHECKED A. Cappen 19 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 1/29/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
TRAY EXTENDER
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020075
SCALE NONE
WT
SHEET 3 OF 3

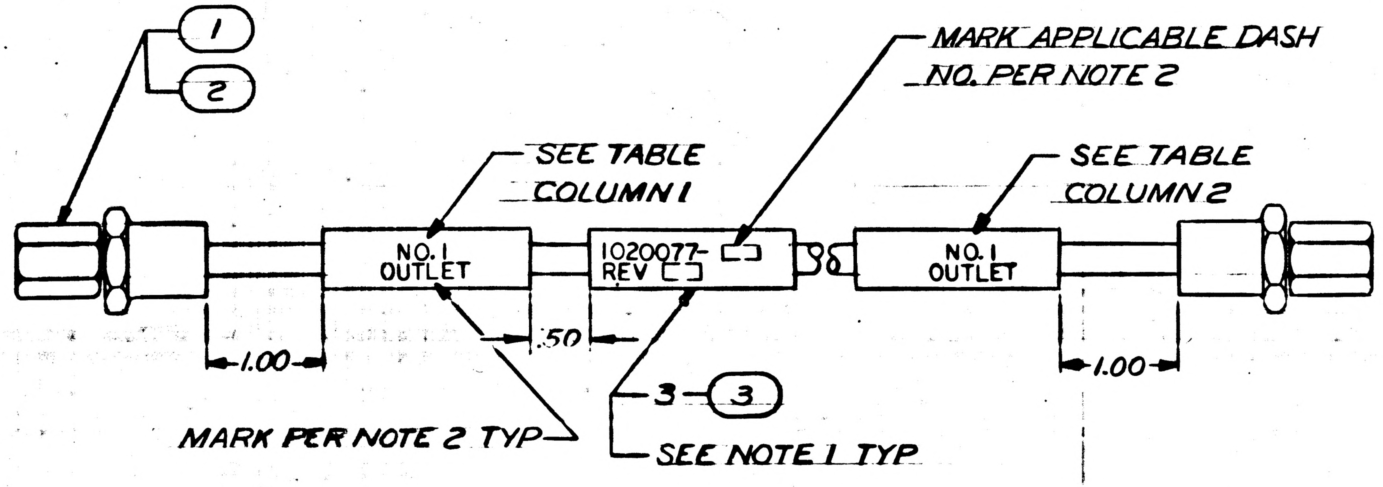
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGE PER TDRR 08122 W. Brown CHK Coggiano APPD	11 MAY 64	KED

Ⓜ



REV STATUS OF ASSY		CONNECTION IDENT	
PART NO.	REV SYMBOL	COLUMN 1	COLUMN 2
1020077-1	A	NO.1 OUTLET	NO.1 OUTLET
1020077-2	A	NO.2 OUTLET	NO.2 OUTLET
1020077-3	A	NO.1 INLET	NO.1 INLET
1020077-4	A	NO.2 INLET	NO.2 INLET

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04573 DATE 11/12/63

NOTES
1. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	3	3	3	1014472-2A	BAND, MARKER, CABLE	3
1	1	—	—	AN6270-4-74	HOSE ASSY	2
—	—	1	1	AN6270-4-78	HOSE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.12 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN W. Matty DATE 16 OCT 63
CHECKED J. Marino 16 OCT 63
APPROVAL C. Sparling 12/4/63
APPROVAL 12/4/63
APPROVAL 12/4/63
NASA APPROVAL 12/11/63
MIT APPROVAL 12/13
MIT APPROVAL 12/11/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOSE ASSEMBLY,
HYDRAULIC

CODE IDENT NO. ——
SIZE C
NASA DRAWING NO. 1020077
SCALE 1/1
WT
SHEET 1 OF 1

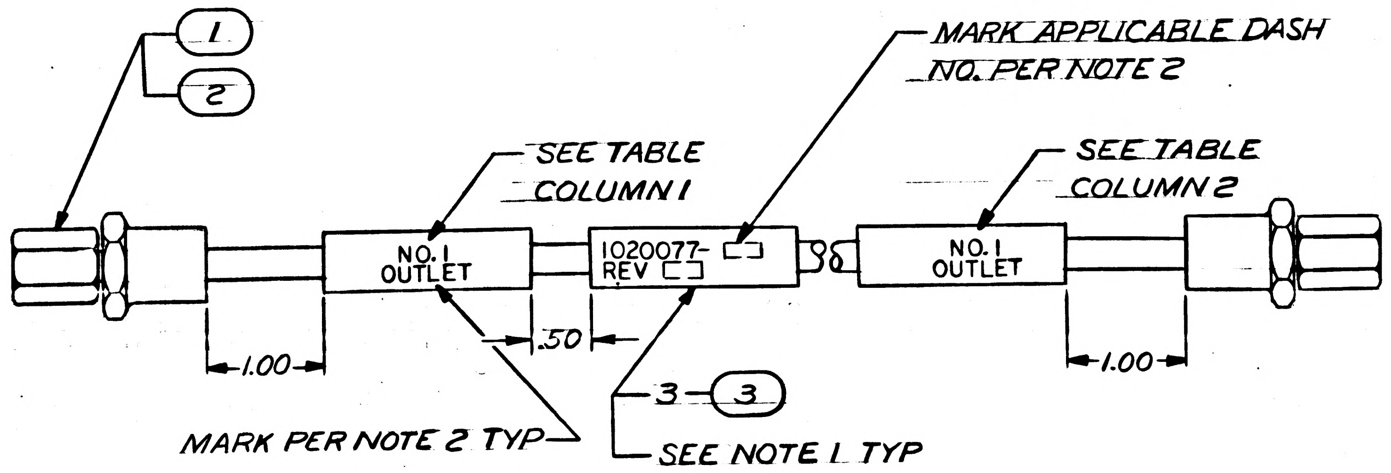
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



REV STATUS OF ASSY		CONNECTION IDENT	
PART NO.	REV SYMBOL	COLUMN 1	COLUMN 2
1020077-1	—	NO.1 OUTLET	NO.1 OUTLET
1020077-2	—	NO.2 OUTLET	NO.2 OUTLET
1020077-3	—	NO.1 INLET	NO.1 INLET
1020077-4	—	NO.2 INLET	NO.2 INLET

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04582 DATE 11/12/63

NOTES
1. BOND FIND NO.3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES

QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	3	3	3	1014472-1A	BAND, MARKER, CABLE	3
1	1	—	—	AN6270-4-74	HOSE ASSY	2
—	—	1	1	AN6270-4-78	HOSE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.12 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Matty DATE 16 OCT 63
CHECKED J. Marinaro 16 OCT 63
APPROVAL C. Spadin JPK 11/4/63
APPROVAL JSB 11/4/63
APPROVAL RB 11/4/63
NASA APPROVAL 11/12/63
MIT APPROVAL 11/12/63
MIT APPROVAL 12 Nov 63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOSE ASSEMBLY, HYDRAULIC

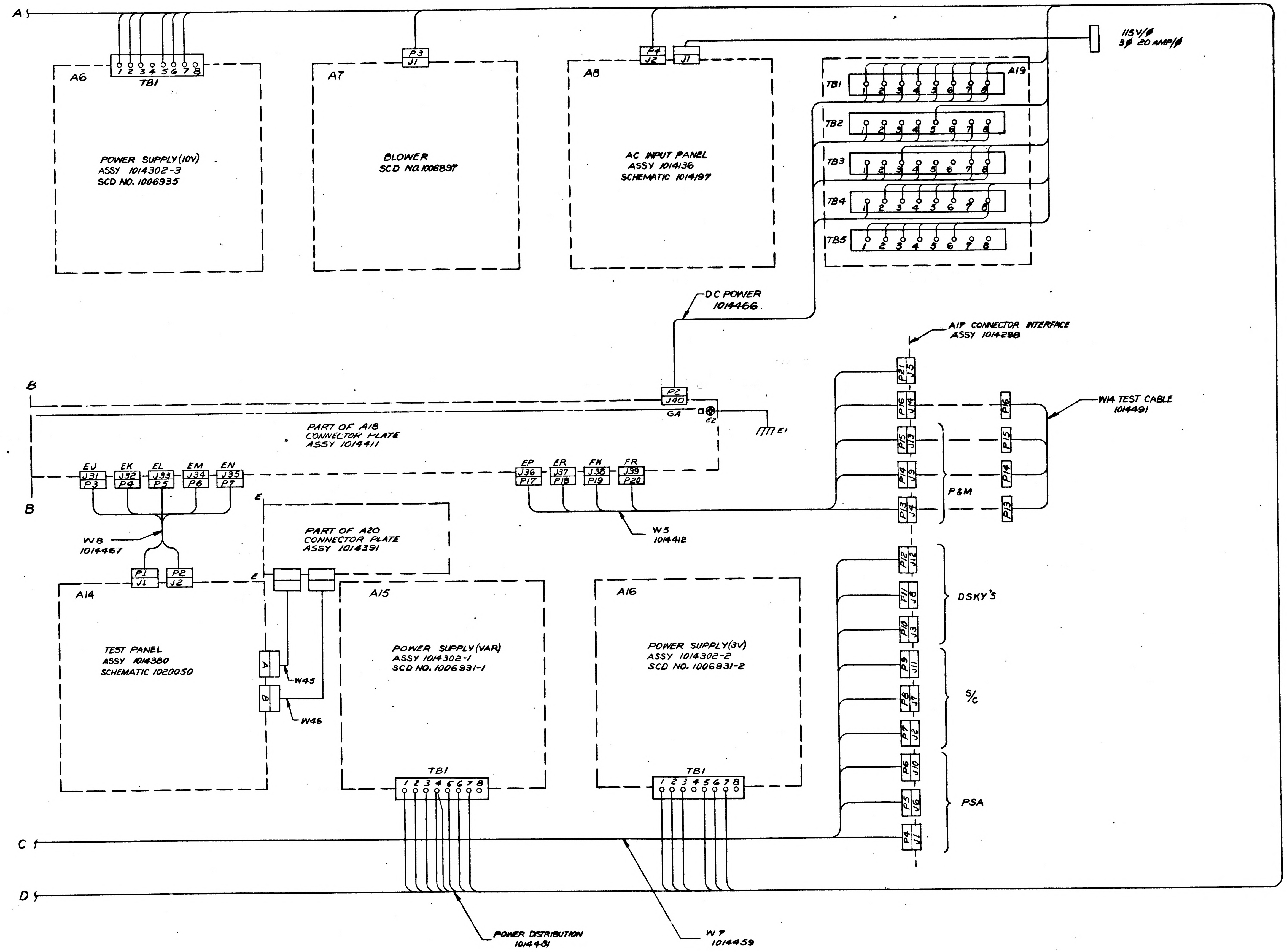
CODE IDENT NO. ——
SIZE C
NASA DRAWING NO. 1020077
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		


A
115V/ϕ
3ϕ 20 AMP/ϕ
TB1
1 2 3 4 5 6 7 8
A6
POWER SUPPLY (10V)
ASSY 1014302-3
SCD NO. 1006935
P3
J1
A7
BLOWER
SCD NO. 1006897
P4
J2
J1
A8
AC INPUT PANEL
ASSY 1014136
SCHEMATIC 1014197
A19
TB1
TB2
TB3
TB4
TB5
DC POWER
1014466
A17 CONNECTOR INTERFACE
ASSY 1014298
B
P2
J40
GA
E2
E1
PART OF A18
CONNECTOR PLATE
ASSY 1014411
EJ EK EL EM EN
J31 J32 J33 J34 J35
P3 P4 P5 P6 P7
EP ER FK FR
J36 J37 J38 J39
P17 P18 P19 P20
W8
1014467
W5
1014412
P21 J5
P16 J14
P15 J13
P14 J9
P13 J4
P16
P15
P14
P13
W14 TEST CABLE
1014491
P&M
E
PART OF A20
CONNECTOR PLATE
ASSY 1014391
P1 J1
P2 J2
A14
TEST PANEL
ASSY 1014380
SCHEMATIC 1020050
A
B
W45
W46
A15
POWER SUPPLY (VAR)
ASSY 1014302-1
SCD NO. 1006931-1
A16
POWER SUPPLY (3V)
ASSY 1014302-2
SCD NO. 1006931-2
P12 J12
P11 J8
P10 J3
DSKY'S
P9 J11
P8 J7
P7 J2
S/C
P6 J10
P5 J6
P4 J1
PSA
C
D
POWER DISTRIBUTION
1014481
W7
1014459

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06580 DATE 10/22/63

SH 1	SH 2
—	—

REVISION STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Bunnelas DATE 18 OCT 63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERCONNECTION DIAGRAM
COMPUTER TEST SET

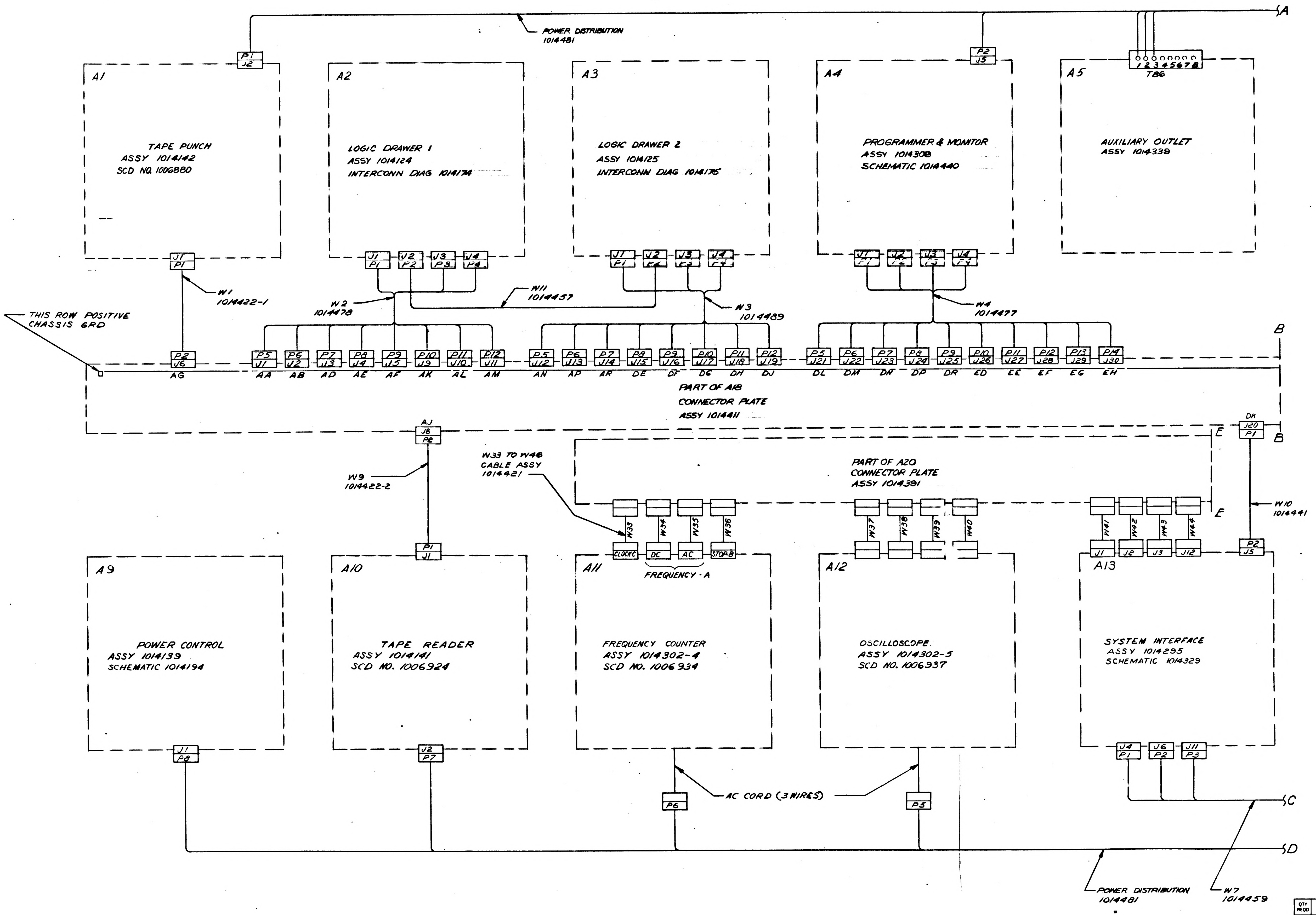
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020078
SCALE NONE
WT
SHEET 1 OF 2

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR.		


POWER DISTRIBUTION
1014481
A
A1
TAPE PUNCH
ASSY 1014142
SCD NO. 1006880
P1
J2
J1
P1
A2
LOGIC DRAWER 1
ASSY 1014124
INTERCONN DIAG 1014174
J1 J2 J3 J4
P1 P2 P3 P4
A3
LOGIC DRAWER 2
ASSY 1014125
INTERCONN DIAG 1014175
J1 J2 J3 J4
P1 P2 P3 P4
A4
PROGRAMMER & MONITOR
ASSY 1014308
SCHEMATIC 1014440
P2
J5
J1 J2 J3 J4
P1 P2 P3 P4
A5
AUXILIARY OUTLET
ASSY 1014339
1 2 3 4 5 6 7 8
TB6
W1
1014422-1
W2
1014478
W11
1014457
W3
1014489
W4
1014477
THIS ROW POSITIVE
CHASSIS GRD
P2
J6
AG
P5 P6 P7 P8 P9 P10 P11 P12
J1 J2 J3 J4 J5 J9 J10 J11
AA AB AD AE AF AK AL AM
P5 P6 P7 P8 P9 P10 P11 P12
J12 J13 J14 J15 J16 J17 J18 J19
AN AP AR DE DF DG DH DJ
P5 P6 P7 P8 P9 P10 P11 P12 P13 P14
J21 J22 J23 J24 J25 J26 J27 J28 J29 J30
DL DM DN DP DR ED EE EF EG EH
B
PART OF A18
CONNECTOR PLATE
ASSY 1014411
AJ
J8
P2
DK
J20
P1
B
E
W9
1014422-2
W33 TO W46
CABLE ASSY
1014421
PART OF A20
CONNECTOR PLATE
ASSY 1014391
E
E
W10
1014441
W33 W34 W35 W36
W37 W38 W39 W40
W41 W42 W43 W44
P1
J1
CLOCKC DC AC STOP.B
FREQUENCY - A
J1 J2 J3 J12
P2
J5
A9
POWER CONTROL
ASSY 1014139
SCHEMATIC 1014194
J1
P9
A10
TAPE READER
ASSY 1014141
SCD NO. 1006924
J2
P7
A11
FREQUENCY COUNTER
ASSY 1014302-4
SCD NO. 1006934
A12
OSCILLOSCOPE
ASSY 1014302-5
SCD NO. 1006937
A13
SYSTEM INTERFACE
ASSY 1014295
SCHEMATIC 1014329
J4 J6 J11
P1 P2 P3
P6
AC CORD (3 WIRES)
P5
C
D
POWER DISTRIBUTION
1014481
W7
1014459

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0580 DATE 11/12/62

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS9-498
DRAWN F.W. Collins DATE 28 AUG 62
CHECKED A. Cozzens 30 Oct
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 4/9/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERCONNECTION DIAGRAM
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020078
SCALE NONE
WT
SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

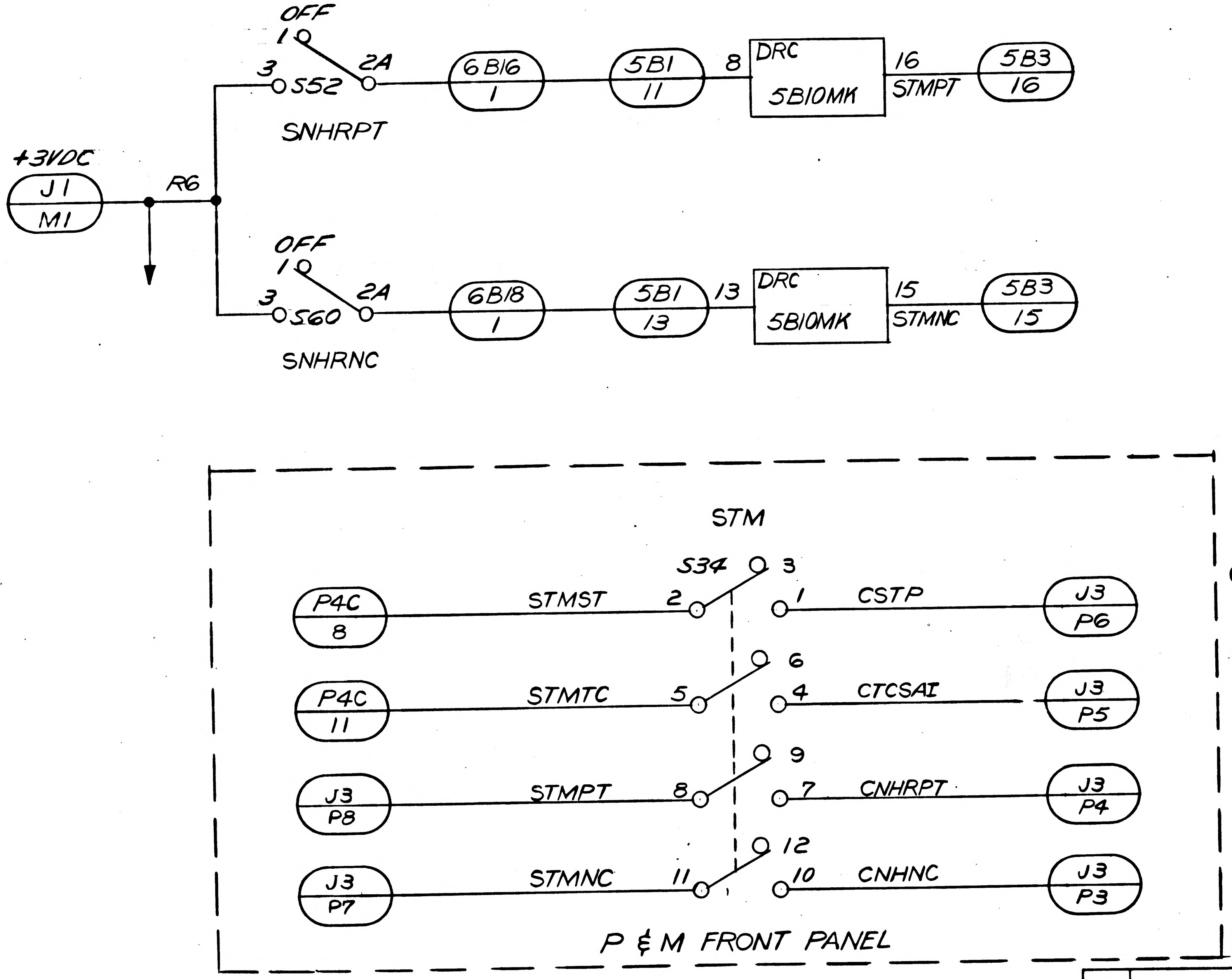
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
	CLASS B RELEASED PER TDRR 04386	5 Nov 63	WK


OFF
1
3
2A
S52
SNHRPT
6B16
1
5B1
11
8
DRC
5B10MK
16
STMPT
5B3
16
+3VDC
J1
M1
R6
OFF
1
3
2A
S60
SNHRNC
6B18
1
5B1
13
13
DRC
5B10MK
15
STMNC
5B3
15
STM
S34
3
P4C
8
STMST
2
1
CSTP
J3
P6
6
P4C
11
STMTC
5
4
CTCSAI
J3
P5
9
J3
P8
STMPT
8
7
CNHRPT
J3
P4
12
J3
P7
STMNC
11
10
CNHNC
J3
P3
P & M FRONT PANEL

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04396 DATE 11/5/63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014125	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P.L. Bucuvalas DATE 15 OCT 63
CHECKED A Caggiano 17 Oct 63
APPROVAL C. Sparling 10/29/63
APPROVAL 10/29/63
APPROVAL 10/28/63
NASA APPROVAL 11-5-63
MIT APPROVAL 5 Nov 63
MIT APPROVAL 11/5/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC DIAGRAM
COMPUTER TEST SET
TEST MODE CIRCUITS LD2

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020079
SCALE NONE
WT
SHEET 1 OF 1

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

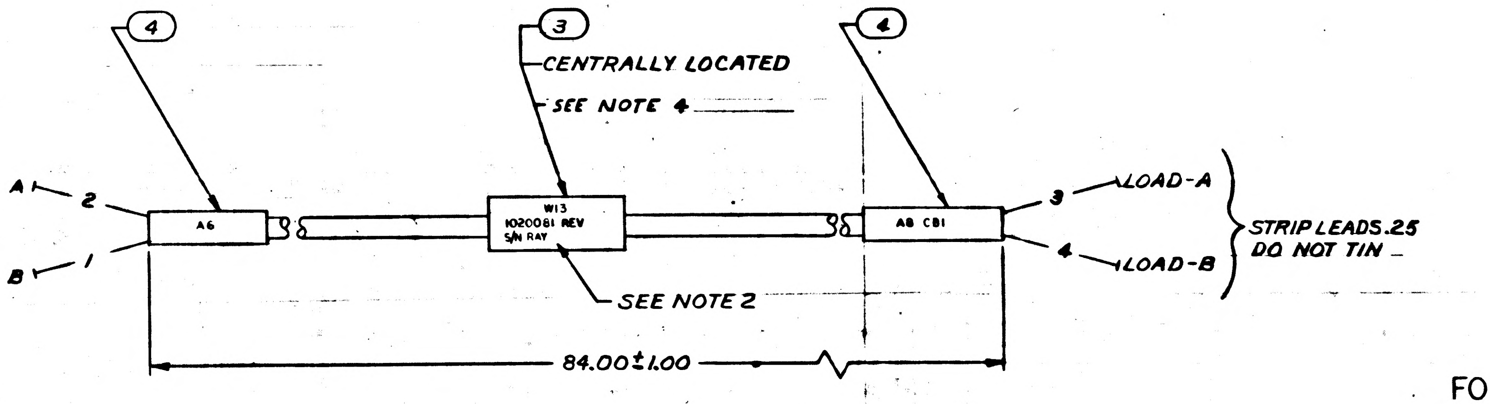
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

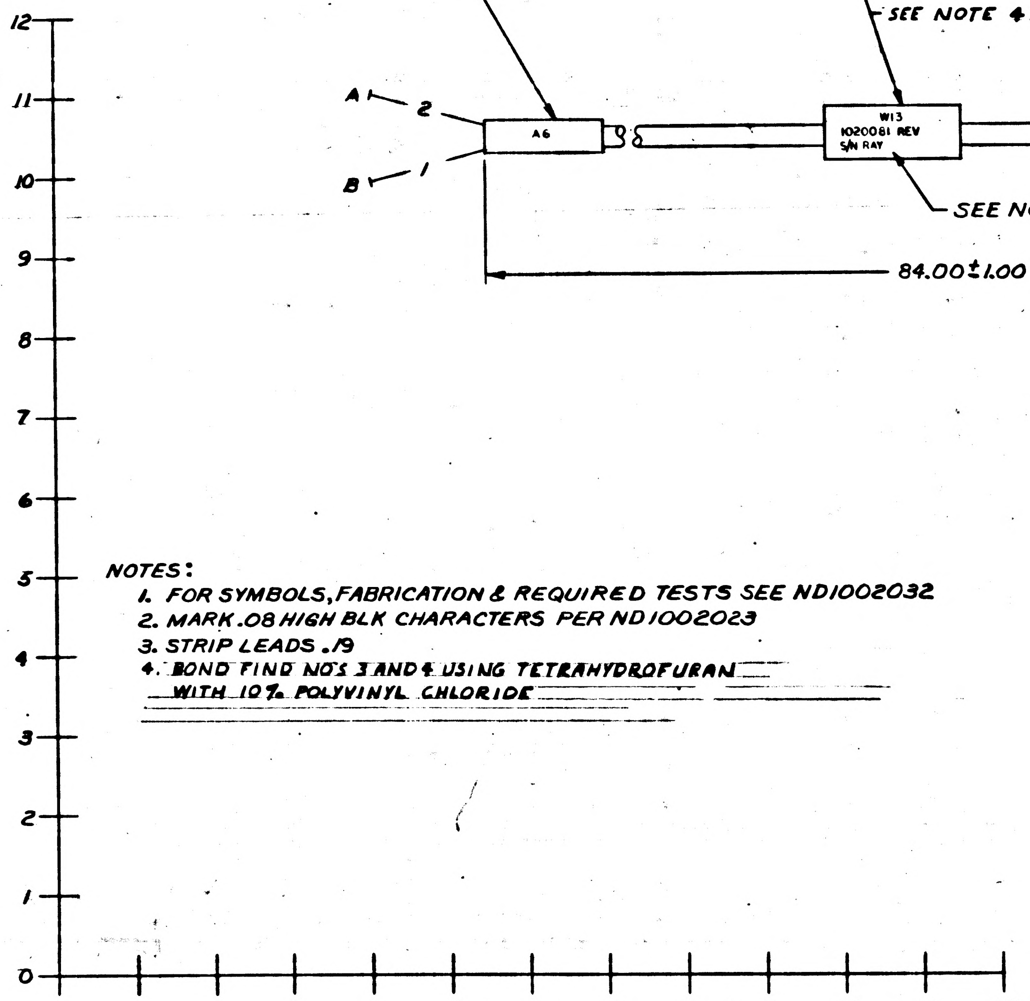
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		
A	CLASS II CHANGE PER RD R5670 DR S.T. CHK W.J. APPD	8 JAN 64	
B	CHANGED PER TDRR 10104 DR. CHK G.G.C. APPD	64	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	18	1	3	ATTACH
	1	WHT			4	FIND NO. 2



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04304 DATE 10/30/63



NOTES:
1. FOR SYMBOLS, FABRICATION & REQUIRED TESTS SEE ND1002032
2. MARK .08 HIGH BLK CHARACTERS PER ND1002023
3. STRIP LEADS .19
4. BOND FIND NO'S 3 AND 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE

2	1014472-1A	BAND MARKER, CABLE	4
1	1014472-1	BAND MARKER, CABLE	3
2	1006960-3	LUG TERMINAL	2
AR	1006966-3	CABLE ELECTRICAL	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014217	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS9-498
DRAWN DATE 21OC63
CHECKED 21 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 30 Oct 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W13
AGC CALIBRATION CONSOLE

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020081
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020081

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

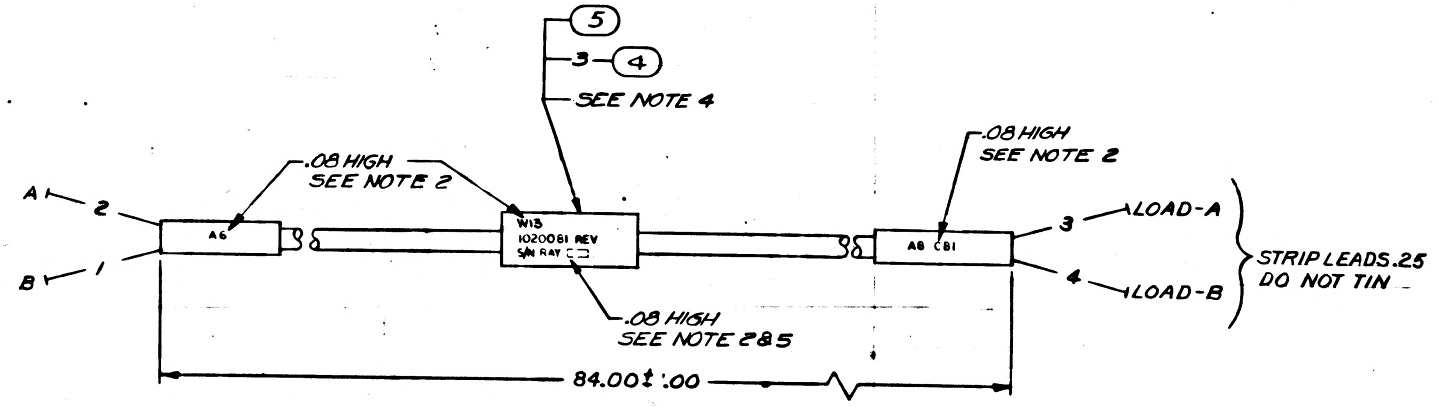
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		
A	CLASS II CHANGE PER RD R5670 DR S.T. [illegible] CHK W.J. Gifford APPD	8 JAN 64	JJF
B	CHANGED PER TDRR 10104 DR. Ken Budd CHK A.G.C. APPD	[illegible] June 64	KEO
C	UPDATE TO CLASS A WITH CHANGES PER TDRR 18766 DR [illegible] CHK J Gilreath APPD	5 MAY 65	5-5-65

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	18	1	3	ATTACH FIND NO. 2
	1	WHT			4	



NOTES:

1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
3. STRIP LEADS .19
4. BOND FIND NO. 4 USING FIND NO. 5
5. SERIALIZE PER ND1002023

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006253	ADHESIVE	5
3	1014472-1A	BAND MARKER, CABLE	4
~~1~~	~~1014472-1~~	~~BAND MARKER, CABLE~~	~~3~~
2	1006960-3	LUG TERMINAL	2
AR	1006966-3	CABLE ELECTRICAL	1

NEXT ASSY	USED ON
1020344	
1014217	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 21 OCT 63
CHECKED 21 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W13
AGC CALIBRATION CONSOLE

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020081
SCALE 1/1
WT
SHEET 1 OF 1

C 1020081

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

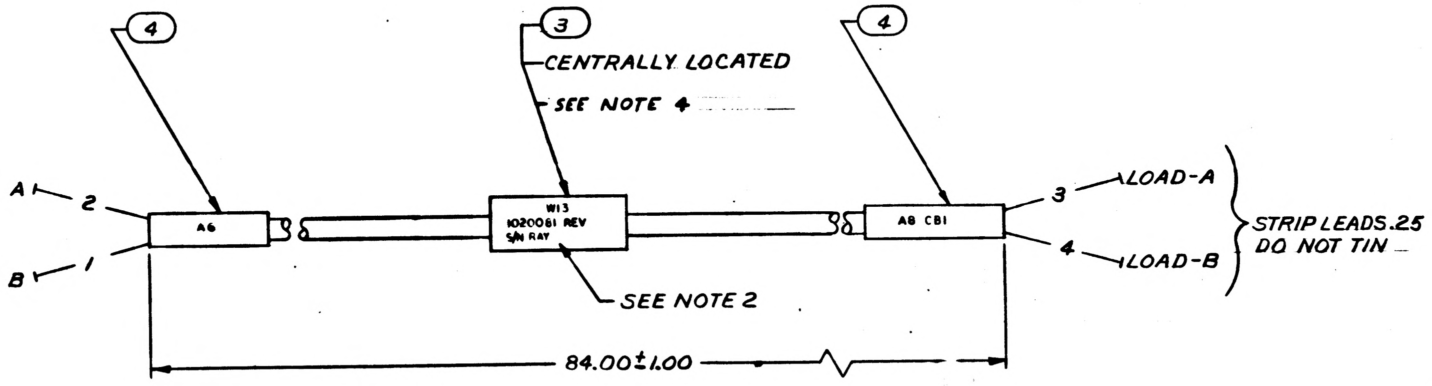
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	18	1	3	ATTACH
	1	WHT			4	FIND NO. 2



STRIP LEADS .25
DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04304 DATE 10/30/63

NOTES:
1. FOR SYMBOLS, FABRICATION & REQUIRED TESTS SEE ND1002032
2. MARK .08 HIGH BLK CHARACTERS PER ND1002023
3. STRIP LEADS .19
4. BOND FIND NOS 3 AND 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1014472-19A	BAND MARKER, CABLE	4
1	1014472-19	BAND MARKER, CABLE	3
2	1006960-3	LUG TERMINAL	2
AR	1006966-3	CABLE ELECTRICAL	1

NEXT ASSY	USED ON
1014217	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 21OCT63
CHECKED 21 OCT 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W13
AGC CALIBRATION CONSOLE

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020081
SCALE 1/1
WT
SHEET 1 OF 1

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

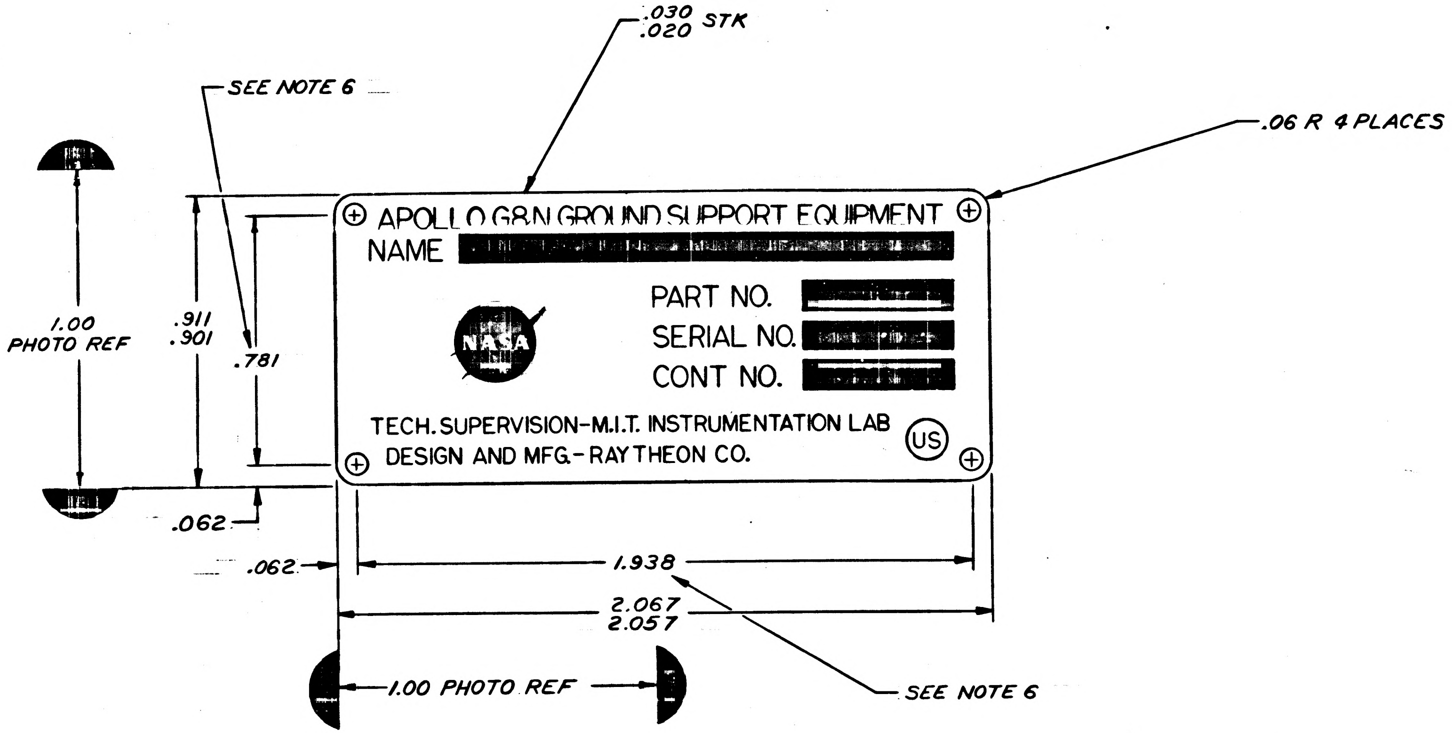
1020081

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



.030
.020 STK
SEE NOTE 6
.06 R 4 PLACES
APOLLO G&N GROUND SUPPORT EQUIPMENT
NAME
PART NO.
SERIAL NO.
CONT NO.
NASA
TECH. SUPERVISION-M.I.T. INSTRUMENTATION LAB
DESIGN AND MFG.-RAYTHEON CO.
US
1.00
PHOTO REF
.911
.901
.781
.062
.062
1.938
2.067
2.057
SEE NOTE 6
1.00 PHOTO REF

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05042 DATE 10 Dec 63

NOTES
1. PLATE & MARKING MUST CONFORM TO REQUIREMENTS AS OUTLINED IN MIL-P-15024, TYPE H
2. MATL: AL 5052-H32 PER QQ-A-318
3. ANODIZE PER MIL-A-8625, TYPE II
4. BACKGROUND TO BE LUSTERLESS BLACK
5. IDENTIFY PER ND1002019
6. MOUNTING HOLES TO BE $^{.067}_{.070}$ DIA 4 PLACES
7. ANY CHANGES MADE TO THIS DRAWING MUST BE MADE TO SCALE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014404	
1020010	
1014434	

APPLICATION

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT
FINAL FINISH

RAYTHEON
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN R.C. Taylor DATE 24 OCT 63
CHECKED 8 NOV 63
APPROVAL JOK
APPROVAL
APPROVAL 11/63
NASA APPROVAL 12/10/63
MIT APPROVAL 12/13/63
MIT APPROVAL 12/10/63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

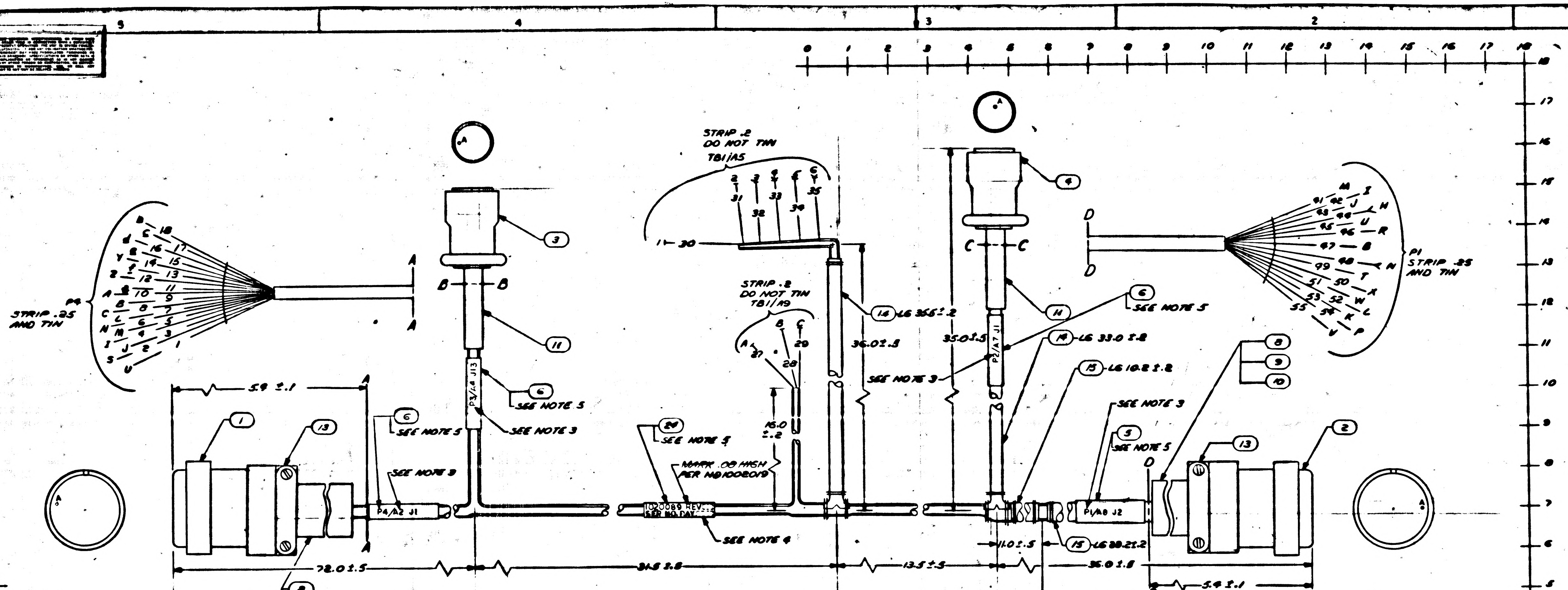
PLATE, IDENTIFICATION
APOLLO G&N
GROUND SUPPORT EQUIPMENT

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 1020085
SCALE 4/1
WT
SHEET 1 OF 1

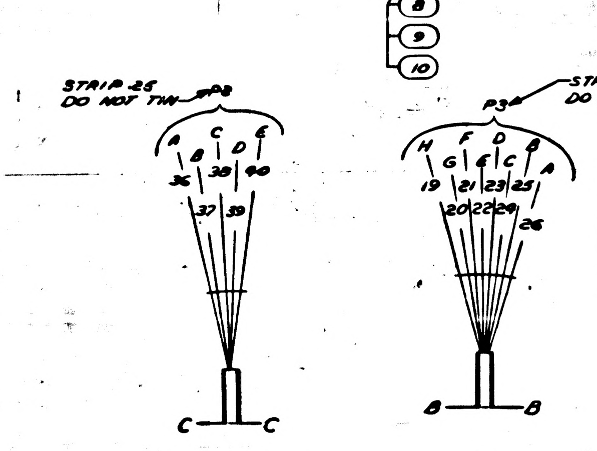
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

D 1020085

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R 58M A DR ~~AP~~ CHK J c J APPD	64	J M
B	CHANGED PER TDRR 09775 DR JDH. CHK 7P7 APPD	11 JUNE 64	KCO



STRIP .25 AND TIN
P4
B C d Y Z A C N I S
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
A A
B B
C C
D D
3
11
6 SEE NOTE 5
SEE NOTE 3
P3/A4 J13
STRIP .2 DO NOT TIN TB1/A5
2 3 4 5 6
31 32 33 34 35
1 – 30
STRIP .2 DO NOT TIN TB1/A9
A B C
27 28 29
15.0 ±.2
14 LG 35.6 ±.2
36.0 ±.5
35.0 ±.5
4
11
P2/A7 J1
14 LG 33.0 ±.2
15 LG 10.2 ±.2
SEE NOTE 3
6 SEE NOTE 5
P1 STRIP .25 AND TIN
M I J H U R B N T X W L K P V
41 42 43 44 45 46 47 48 99 50 51 52 53 54 55
8 9 10
1
13
5.9 ±.1
6 SEE NOTE 5
SEE NOTE 3
P4/A2 J1
24 SEE NOTE 5
MARK .08 HIGH PER ND1002019
1020089 REV SER NO. DAY
SEE NOTE 4
SEE NOTE 3
5 SEE NOTE 5
P1/A8 J2
2
13
11.0 ±.5
15 LG 38.2 ±.2
72.0 ±.5
31.5 ±.8
13.5 ±.5
36.0 ±.8
5.4 ±.1
E1 — 56
STRIP .25 DO NOT TIN

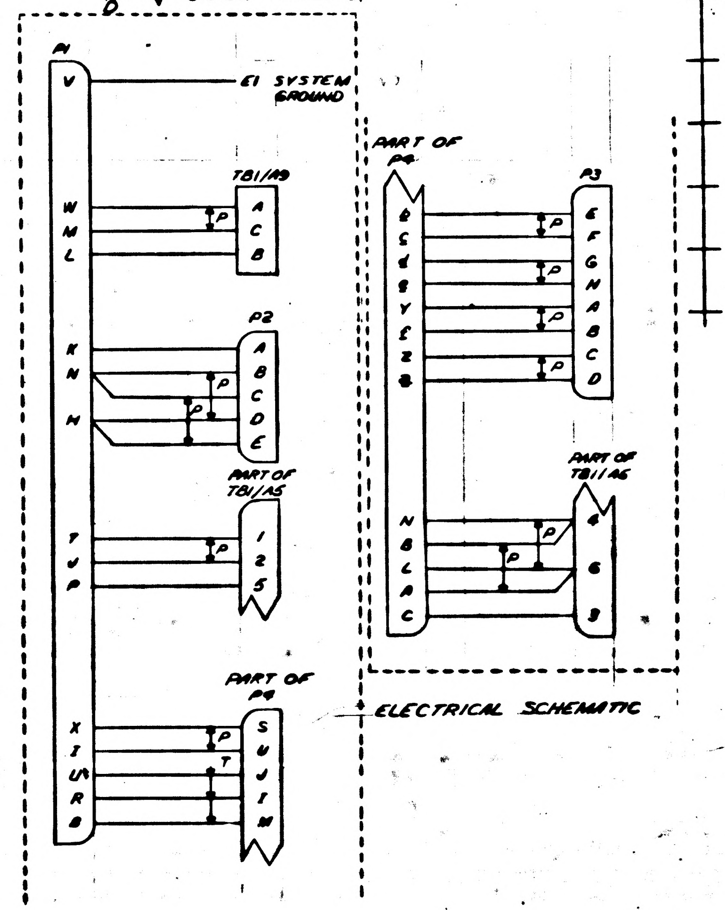


STRIP .25 DO NOT TIN — P8
A B C D E
36 38 40
37 39
C C
P3 — STRIP .25 DO NOT TIN
H G F E D C B A
19 21 23 25
20 22 24 26
B B

TWIST CHART
5-47 WITH 4-46 & 3-45
2-50 WITI 1-42
27-51 WITH 9-41
30-49 WIT 1-43
38-48 WITH 40-44
37-48 WITH -44

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	18	WHT	22	23	22	
	17	BLK			21	
	16	WHT	22	23	20	
	15	BLK			19	
	14	WHT	22	23	26	
	13	BLK			25	
	12	WHT	22	23	24	
	11	BLK			23	
	6	RED	18	22	33	ATTACH FIND NO. 7
	7	BLK			35	ATTACH FIND NO. 7
ATTACH FIND NO. 7	33	RED	20	21	9	
ATTACH FIND NO. 7	35	BLK			10	
	5	WHT/RED/GY	18	19	47	SEE TWIST CHART
	4	WHT/RED/GY			46	
	3	WHT/BLK/GY		18	45	
	2	WHT/RED/GY	18	19	50	SEE TWIST CHART
	1	WHT/BLK/GY		18	42	
ATTACH FIND NO. 7	27	WHT/RED/GY	18	19	51	SEE TWIST CHART
ATTACH FIND NO. 7	29	WHT/BLK/GY		18	41	
ATTACH FIND NO. 7	30	WHT/RED/GY	18	19	49	SEE TWIST CHART
ATTACH FIND NO. 7	31	WHT/BLK/GY		18	43	
	37	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	39	WHT/BLK/GY		18	44	
	38	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	40	WHT/BLK/GY		18	46	
	55	BLK	12	16	56	ATTACH FIND NO. 12
	8	BLK	20	17	32	ATTACH FIND NO. 7
ATTACH FIND NO. 7	28	↕	↕	↕	52	
ATTACH FIND NO. 7	34				54	
	36	BLK	20	17	53	



P1
V
E1 SYSTEM GROUND
W M L
TB1/A9
A C B
P
K H N H
P2
A B C D E
P
T U P
PART OF TB1/A5
1 2 5
X I U R B
PART OF P4
S U J I M
P
T
PART OF P4
E C d Y Z B
P3
E F G H A B C D
P
PART OF TB1/A6
N B L A C
4 6 3
P

ELECTRICAL SCHEMATIC

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE A CLASS I CATEGORY I FOR FIND NO. 14 AWG 5/16 FOR. FIND NO.15 AWG 1/4
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND FIND NO. 5, 6, AND 24 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. SOLDER PER MIL-S-6872

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1014472-2	BAND MARKER, CABLE	24
AR	1014391-11	WIRE ELEC	23
AR	1014391-5	WIRE ELEC	22
AR	1014391-6	WIRE, ELEC	21
AR	MIL-W-16878/4 TYPE E,18 WHT/BRN/GY	WIRE, ELEC.	20
AR	MIL-W-16878/4 TYPE E,18 WHT/RED/GY	WIRE, ELEC	19
AR	MIL-W-16878/4 TYPE E,18 WHT/BLK/GY	WIRE, ELEC.	18
AR	MIL-W-16878/4 TYPE E,20 BLK	WIRE, ELEC	17
AR	MIL-W-16878/4 TYPE E,12 BLK	WIRE, ELEC.	16
AR	SEE NOTE 2	SLEEVING	15
AR	SEE NOTE 2	SLEEVING	14
2	MS3057-24B	CLAMP	13
1	MS25036-1?	CRIMP LUG	12
2	MS39056-4	BUSHING	11
2	AN3420-12A	BUSHING	10
2	AN3420-16A	BUSHING	9
2	AN3420-20A	BUSHING	8
11	MS25036-1	CRIMP, LUG	7
3	1014472-2A	BAND MARKER, CABLE	6
1	1014472-3A	BAND MARKER, CABLE	5
1	MS3126F-14-5S	CONNECTOR, PLUG	4
1	MS3126F-16-8S	CONNECTOR, PLUG	3
1	MS3106A-36-9P	CONNECTOR, PLUG	2
1	MS3106A-36-9S	CONNECTOR, PLUG	1

LIST OF MATERIALS

1020089

1014965	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-497

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
AC/DC POWER DISTRIBUTION
AGC/CTS OPERATION CONSOLE

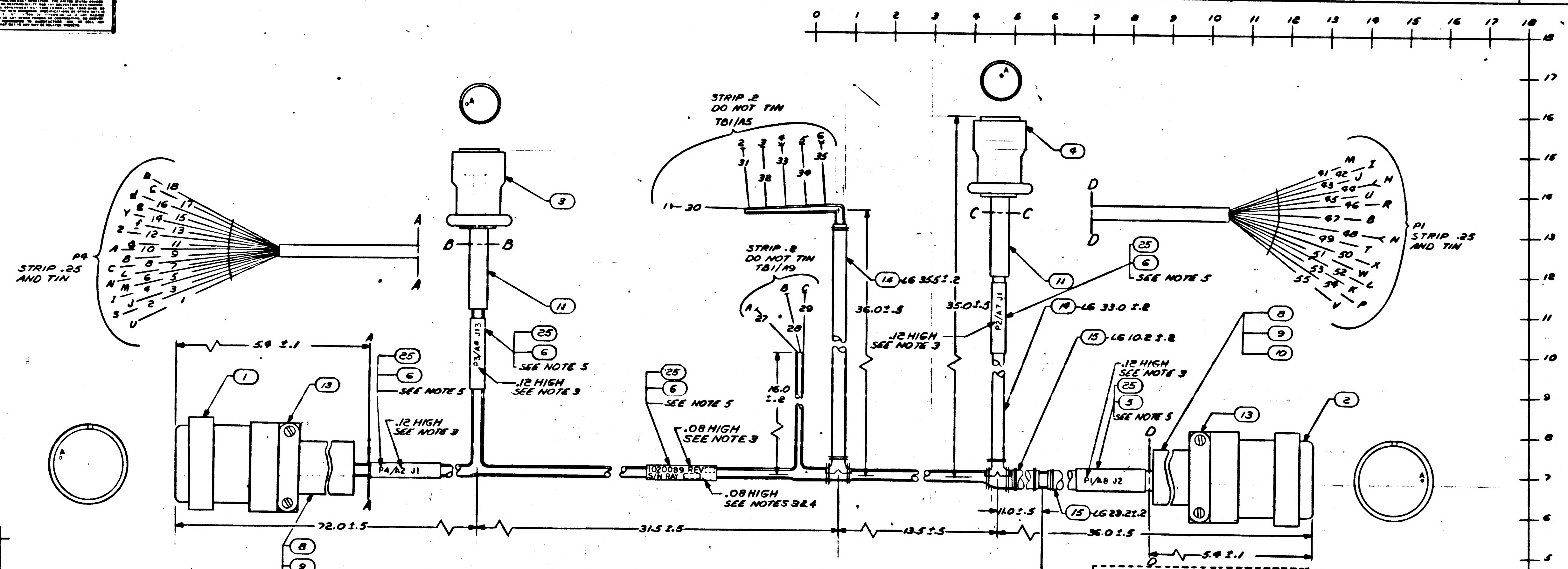
DRAWN DATE
CHECKED 11 Nov 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL

CODE IDENT NO.	SIZE	DRAWING NO.
—	J	1020089

SCALE 1/1 WT SHEET 1 OF 1

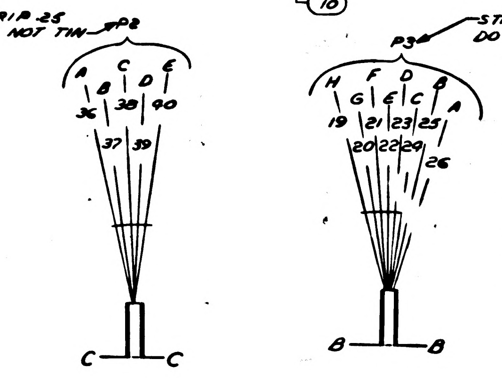
MASTER

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5814A DR CHK JCJ APPD	11 MAR 64	
B	CHANGED PER TDRR 09775 DR CHK JDF APPD	11 JUNE 64	KCO
C	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK D.I. English APPD	26 MAR 65	

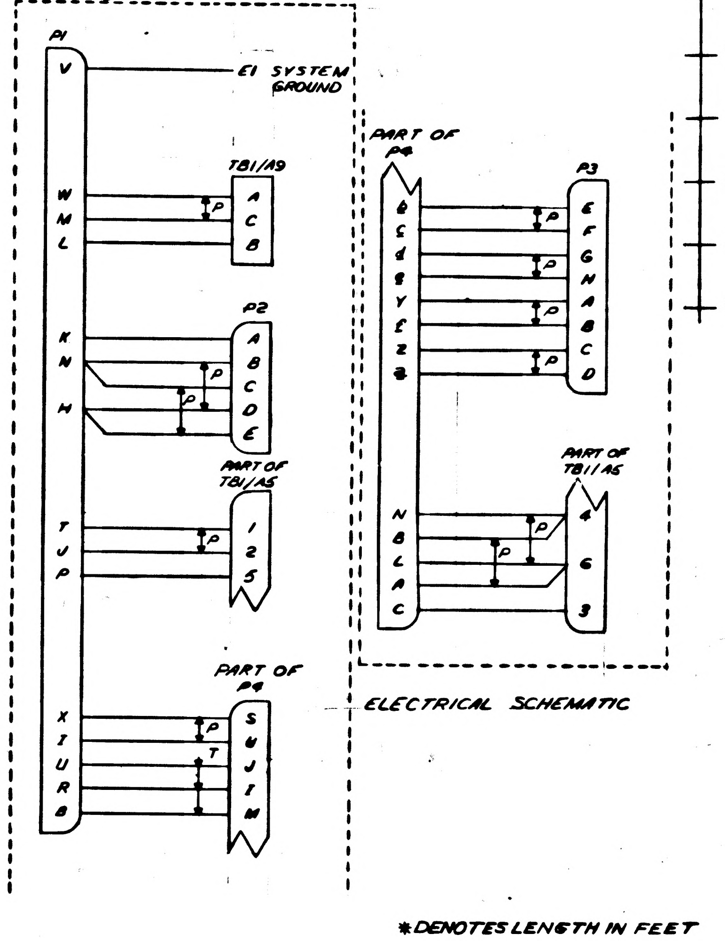


STRIP .25 AND TIN
P4
STRIP .2 DO NOT TIN
TB1/A5
1 — 30
STRIP .2 DO NOT TIN
TB1/A9
P1
STRIP .25 AND TIN
5.4 ±.1
72.0 ±.5
31.5 ±.5
13.5 ±.5
11.0 ±.5
36.0 ±.5
16.0 ±.2
36.0 ±.5
35.0 ±.5
L6 35.5 ±.2
L6 33.0 ±.2
L6 10.2 ±.2
L6 23.2 ±.2
.12 HIGH SEE NOTE 3
.08 HIGH SEE NOTE 3
.08 HIGH SEE NOTES 3 & 4
SEE NOTE 5
P4/A2 J1
P3/A9 J13
P2/A7 J1
P1/A8 J2
1020089 REV S/N RAY
A
B
C
D
1
2
3
4
5
6
8
9
10
11
13
14
15
25

E1 —— 56
STRIP .25
DO NOT TIN



STRIP .25 DO NOT TIN
P2
P3
STRIP .25 DO NOT TIN
A C D E
36 38 40
37 39
H G F E D B
19 21 23 25
20 22 24
26
C — C
B — B



P1
E1 SYSTEM GROUND
TB1/A9
P2
PART OF TB1/A5
PART OF P4
PART OF P4
P3
PART OF TB1/A6
ELECTRICAL SCHEMATIC

TWIST CHART
5-47 WITH 4-46 & 3-45
2-50 WITH 1-42
27-51 WITH 29-41
30-49 WITH 31-43
38-48 WITH 40-44
37-48 WITH 39-44

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	18	WHT	22	23	22	
	17	BLK			21	
	16	WHT	22	23	20	
	15	BLK			19	
	14	WHT	22	23	26	
	13	BLK			25	
	12	WHT	22	23	24	
	11	BLK			23	
	6	RED	18	22	33	ATTACH FIND NO. 7
	7	BLK			35	ATTACH FIND NO. 7
ATTACH FIND NO. 7	33	RED	20	21	9	
ATTACH FIND NO. 7	35	BLK			10	
	5	WHT/RED/GY	18	19	47	SEE TWIST CHART
	4	WHT/RED/GY			46	
	3	WHT/BLK/GY		18	45	
	2	WHT/RED/GY	18	19	50	SEE TWIST CHART
	1	WHT/BLK/GY		18	42	
ATTACH FIND NO. 7	27	WHT/RED/GY	18	19	51	SEE TWIST CHART
ATTACH FIND NO. 7	29	WHT/BLK/GY		18	41	
ATTACH FIND NO. 7	30	WHT/RED/GY	18	19	49	SEE TWIST CHART
ATTACH FIND NO. 7	31	WHT/BLK/GY		18	43	
	37	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	39	WHT/BLK/GY		18	44	
	38	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	40	WHT/BLK/GY		18	44	
	55	BLK	12	16	56	ATTACH FIND NO. 12
	8	BLK	20	17	32	ATTACH FIND NO. 7
ATTACH FIND NO. 7	28	↕	↕	↕	52	
ATTACH FIND NO. 7	34				54	
	36	BLK	20	17	53	

NOTES
1. FOR FABRICATION, SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE A CLASS I CATEGORY I FOR FIND NO. 14 AWG $\frac{5}{16}$ FOR. FIND NO. 15 AWG $\frac{1}{4}$
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. SERIALIZE PER ND1002023
5. BOND USING FIND 25 APPROX AS SHOWN
6. SOLDER PER ND1002071
7. CRIMP PER ND1002206

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	25
	~~1~~	~~1014472-2~~	~~BAND MARKER, CABLE~~	~~24~~
*	24	1019391-11	WIRE ELEC	23
*	12	1019391-5	WIRE ELEC	22
*	12	1019391-6	WIRE, ELEC	21
*	12	MIL-W-16878/4 TYPE E,18 WHT/BRN/GY	WIRE, ELEC,	20
*	60	MIL-W-16878/4 TYPE E,18 WHT/RED/GY	WIRE, ELEC	19
*	60	MIL-W-16878/4 TYPE E,18 WHT/BLK/GY	WIRE, ELEC,	18
*	40	MIL-W-16878/4 TYPE E,20 BLK	WIRE, ELEC	17
*	3.0	MIL-W-16878/4 TYPE E,12 BLK	WIRE, ELEC	16
*	4.0	SEE NOTE 2	SLEEVING	15
*	6.0	SEE NOTE 2	SLEEVING	14
	2	MS3057-24B	CLAMP	13
	1	MS25036-14	CRIMP LUG	12
	2	MS39056-4	BUSHING	11
	2	AN3420-12A	BUSHING	10
	2	AN3420-16A	BUSHING	9
	2	AN3420-20A	BUSHING	8
	11	MS25036-1	CRIMP, LUG	7
	4	1019472-2A	BAND MARKER, CABLE	6
	1	1019472-3A	BAND MARKER, CABLE	5
	1	MS3126F-14-5S	CONNECTOR, PLUG	4
	1	MS3126F-16-8S	CONNECTOR, PLUG	3
	1	MS3106A-36-9P	CONNECTOR, PLUG	2
	1	MS3106A-36-9S	CONNECTOR, PLUG	1

LIST OF MATERIALS

*DENOTES LENGTH IN FEET

MASTER

NEXT ASSY	USED ON
1014465	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN P.D. Chin DATE
CHECKED 11 Mar 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

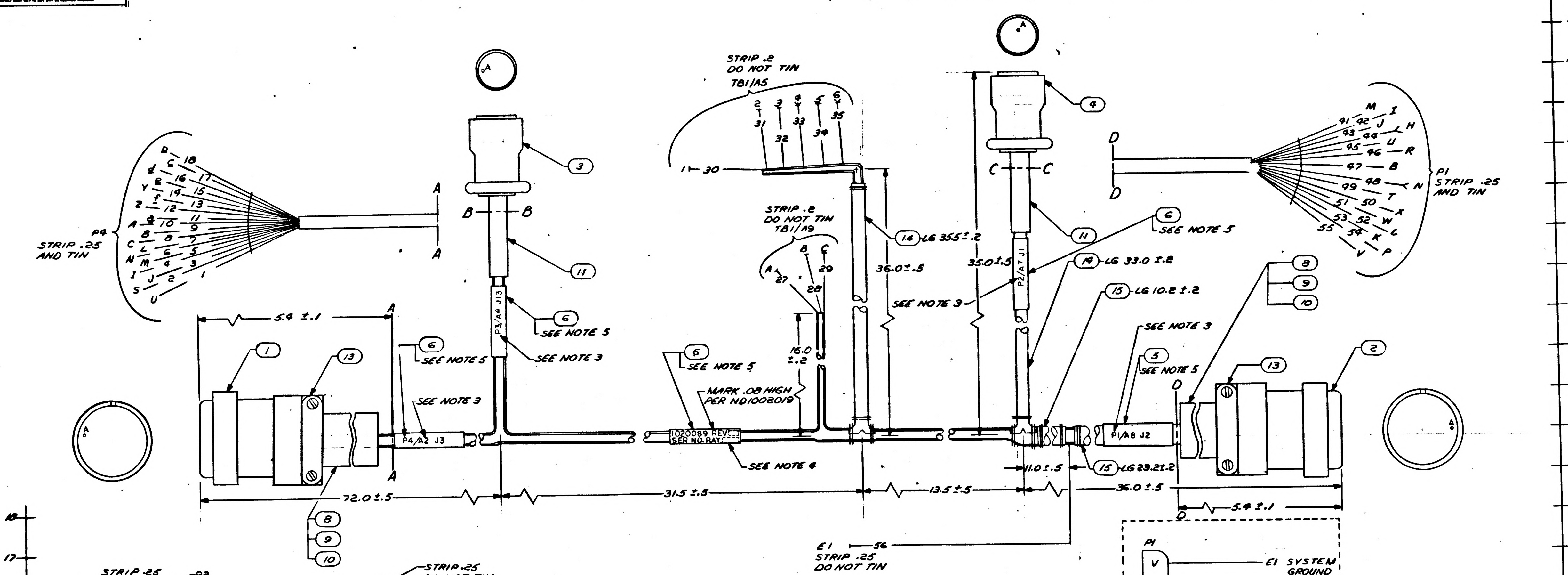
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

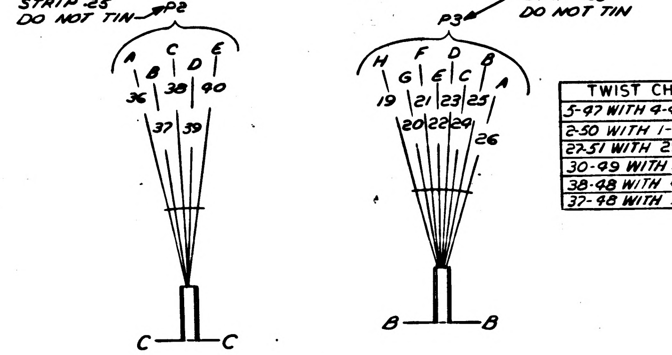
WIRING HARNESS, BRANCHED
AC/DC POWER DISTRIBUTION
OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020089
SCALE 1/1 WT SHEET 1 OF 1

1020089 C

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		


STRIP .2
DO NOT TIN
TB1/A5
2 3 4 5 6
31 32 33 34 35
1 — 30
STRIP .2
DO NOT TIN
TB1/A9
A B C
27 28 29
16.0 ±.2
MARK .08 HIGH PER ND1002019
1020089 REV
SER NO. RAY
SEE NOTE 4
SEE NOTE 5
SEE NOTE 3
14 — LG 35.5 ±.2
36.0 ±.5
35.0 ±.5
14 — LG 33.0 ±.2
15 — LG 10.2 ±.2
15 — LG 23.2 ±.2
P2/A7 J1
P3/A4 J13
P4/A2 J3
P1/A8 J2
P4
STRIP .25
AND TIN
P1
STRIP .25
AND TIN
5.4 ±.1
72.0 ±.5
31.5 ±.5
13.5 ±.5
11.0 ±.5
36.0 ±.5
5.4 ±.1
A — A
B — B
C — C
D — D
E1 — 56
STRIP .25
DO NOT TIN
1
2
3
4
6
8
9
10
11
13

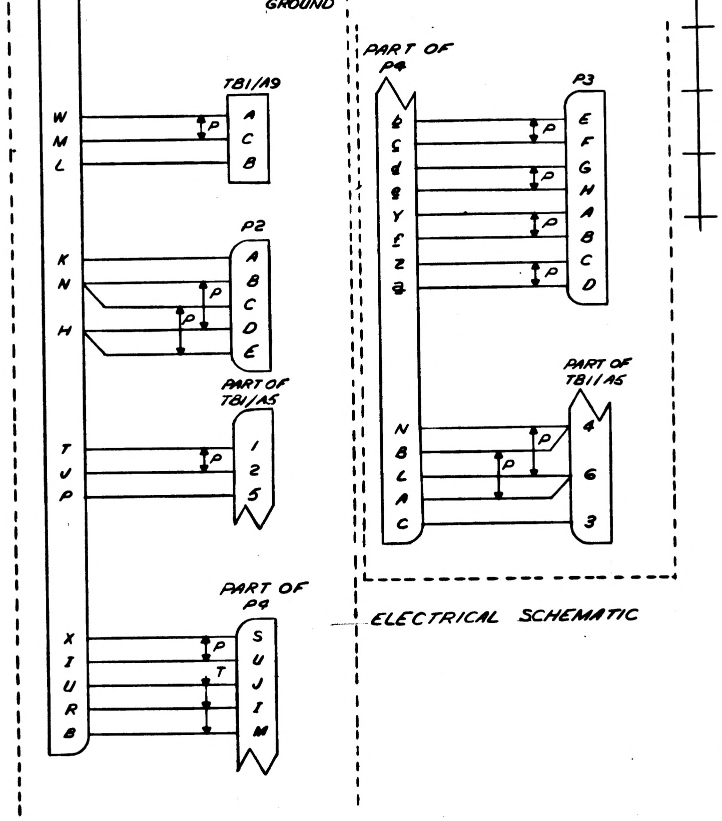

STRIP .25
DO NOT TIN
P2
A B C D E
36 37 38 39 40
P3
STRIP .25
DO NOT TIN
H G F E D C B A
19 20 21 22 23 24 25 26
C — C
B — B

TWIST CHART
5-47 WITH 4-46 & 3-45
2-50 WITH 1-42
27-51 WITH 29-41
30-49 WITH 31-43
38-48 WITH 40-44
37-48 WITH 39-44

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	18	WHT	22	23	22	
	17	BLK			21	
	16	WHT	22	23	20	
	15	BLK			19	
	14	WHT	22	23	26	
	13	BLK			25	
	12	WHT	22	23	24	
	11	BLK			23	
	6	RED	18	22	33	ATTACH FIND NO. 7
	7	BLK			35	ATTACH FIND NO. 7
ATTACH FIND NO. 7	33	RED	20	21	9	
ATTACH FIND NO. 7	35	BLK			10	
	5	WHT/RED/GY	18	19	47	SEE TWIST CHART
	4	WHT/RED/GY			46	
	3	WHT/BLK/GY		18	45	
	2	WHT/RED/GY	18	19	50	SEE TWIST CHART
	1	WHT/BLK/GY		18	42	
ATTACH FIND NO. 7	27	WHT/RED/GY	18	19	51	SEE TWIST CHART
ATTACH FIND NO. 7	29	WHT/BLK/GY		18	41	
ATTACH FIND NO. 7	30	WHT/RED/GY	18	19	49	SEE TWIST CHART
ATTACH FIND NO. 7	31	WHT/BLK/GY		18	43	
	37	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	39	WHT/BLK/GY		18	44	
	38	WHT/BRN/GY	18	20	48	SEE TWIST CHART
	40	WHT/BLK/GY		18	44	
	55	BLK	12	16	56	ATTACH FIND NO. 12
	8	BLK	20	17	32	ATTACH FIND NO. 7
ATTACH FIND NO. 7	28	↕	↕	↕	52	
ATTACH FIND NO. 7	34				54	
	36	BLK	20	17	53	

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua GRADE A CLASS I CATEGORY I FOR FIND NO. 14 AWG $\frac{5}{16}$ FOR FIND NO. 15 AWG $\frac{1}{2}$
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND FIND NO. 5 AND 6 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. SOLDER PER MIL-S-6872


P1
V
E1 SYSTEM GROUND
W
M
L
TB1/A9
A
C
B
P
K
N
H
P2
A
B
C
D
E
PART OF TB1/A5
1
2
5
T
U
P
PART OF P4
S
U
J
I
M
X
I
U
R
B
PART OF P4
b
c
d
e
Y
f
Z
a
P3
E
F
G
H
A
B
C
D
N
B
L
A
C
PART OF TB1/A6
4
6
3

ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04935 DATE 3 Dec 63

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1014391-11	WIRE ELEC	23
AR	1014391-5	WIRE ELEC	22
AR	1014391-6	WIRE, ELEC	21
AR	ND1002181 TYPE I CL I	WIRE, ELEC, AWG 18 WHT/BRN/GY	20
AR	ND1002181 TYPE I CL I	WIRE, ELEC, AWG 18 WHT/RED/GY	19
AR	ND1002181 TYPE I CL I	WIRE, ELEC, AWG 18 WHT/BLK/GY	18
AR	ND1002181 TYPE I CL I	WIRE, ELEC, AWG 20 BLK	17
AR	ND1002181 TYPE I CL I	WIRE, ELEC, AWG 12 BLK	16
AR	SEE NOTE 2	SLEEVING	15
AR	SEE NOTE 2	SLEEVING	14
2	MS3057-24B	CLAMP	13
1	MS25036-14	CRIMP LUG	12
2	MS39056-4	BUSHING	11
2	AN3420-12A	BUSHING	10
2	AN3420-16A	BUSHING	9
2	AN3420-20A	BUSHING	8
11	MS25036-1	CRIMP, LUG	7
4	1014472-1A	BAND MARKER, CABLE	6
1	1014472-2A	BAND MARKER, CABLE	5
1	MS3126F-14-5S	CONNECTOR, PLUG	4
1	MS3126F-16-8S	CONNECTOR, PLUG	3
1	MS3106A-36-9P	CONNECTOR, PLUG	2
1	MS3106A-36-9S	CONNECTOR, PLUG	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014965	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. D. Chin DATE
CHECKED A. Caggiano 11 Nov 63
APPROVAL JPK
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 3 Dec 63
MIT APPROVAL 12-4-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

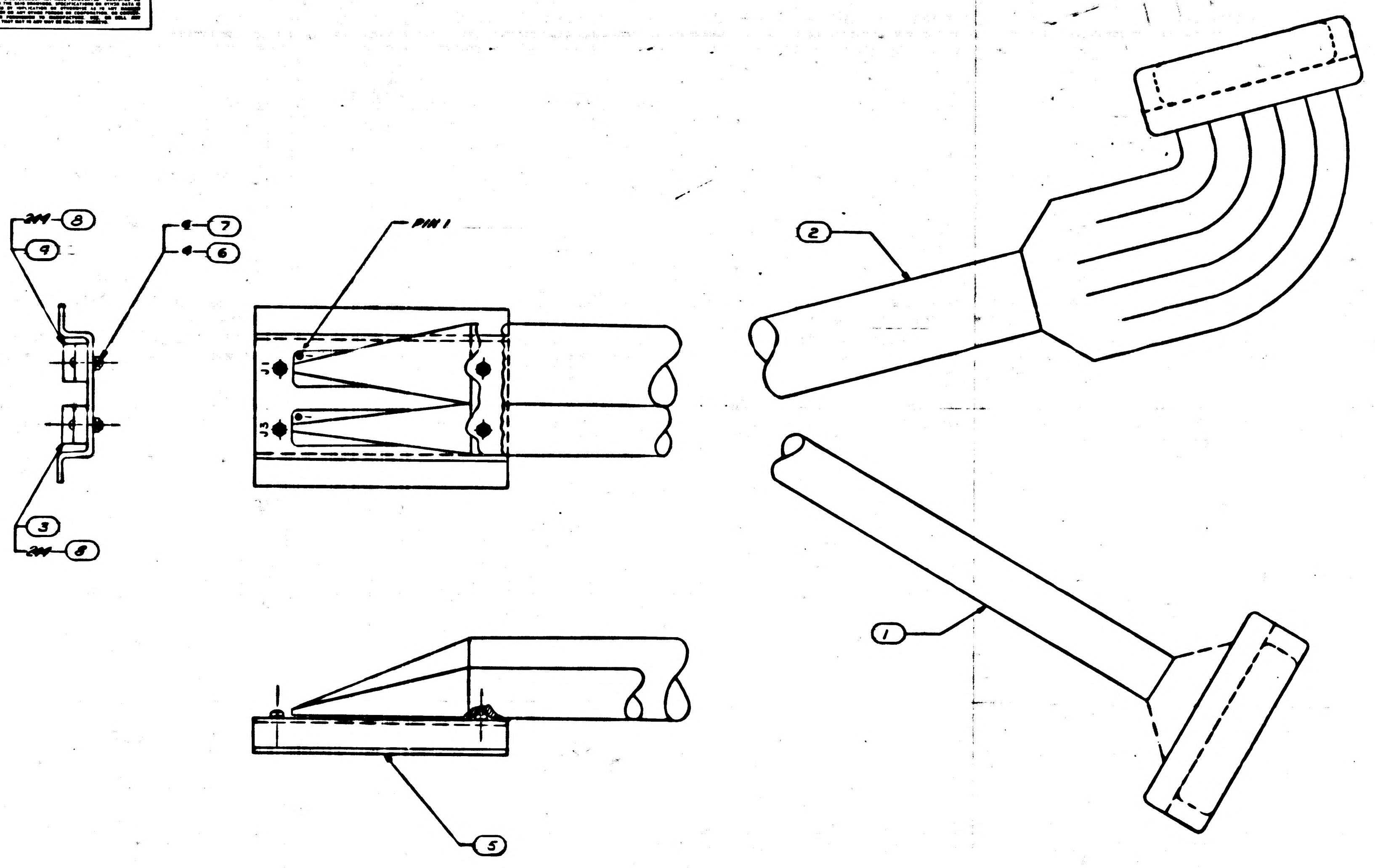
WIRING HARNESS, BRANCHED
AC/DC POWER DISTRIBUTION
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO. 1020089
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		
A	CHANGED PER TDRR 10453 DR. W.Dunn CHK. A.G.C. APPD.	21 June 64	K.B.



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

NOTES
1. WIRE PER ND1002032
2. SEE DWG NO. 1020092 & 1020093 FOR WIRING INFORMATION
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
488	1010738-2	CONTACT, ELEC. SOCKET	8
4	NAS1021C04	NUT, SELF LOCKING	7
4	MS35216-16	SCREW, PAN HEAD	6
1	1020005	BRACKET, CONNECTOR	5
1	1010692-2	CONNECTOR	4
1	1010692-3	CONNECTOR	3
1	1020092	CABLE ASSY	2
1	1020093	CABLE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020010	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO
LEXINGTON MASS
CONTRACT NO. NAS 9-495
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE & BRACKET ASSY
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020091
SCALE 1/1
WT
SHEET 1 OF 1

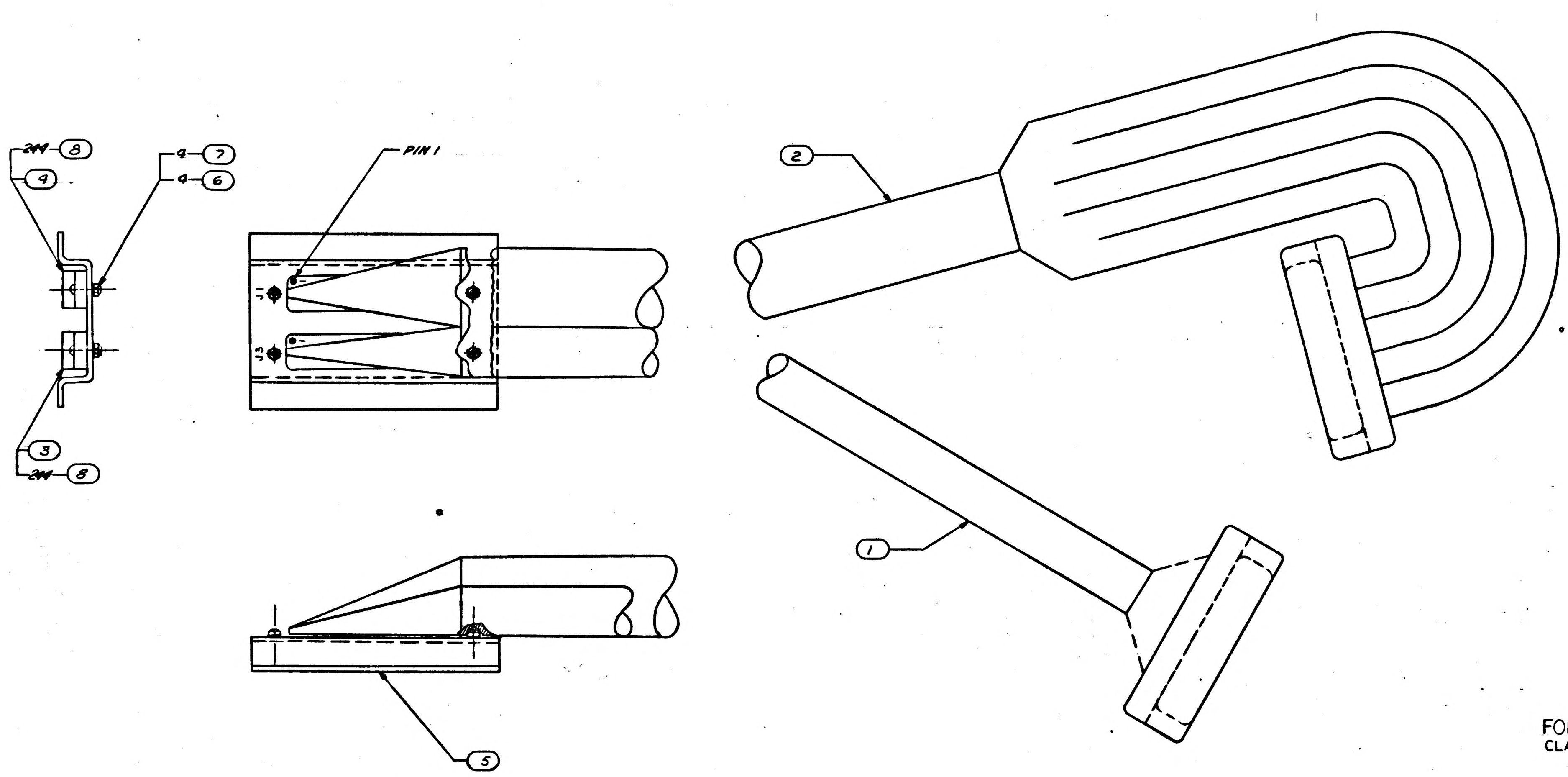
1020091

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

NOTES
1. WIRE PER ND1002032
2. SEE DWG NO. 10200092 & 10200093 FOR WIRING INFORMATION
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
488	1010738-2	CONTACT, ELEC, SOCKET	8
4	NAS1021C09	NUT, SELF LOCKING	7
4	MS35216-16	SCREW, PAN HEAD	6
1	1020005	BRACKET, CONNECTOR	5
1	1010642-2	CONNECTOR	4
1	1010642-3	CONNECTOR	3
1	1020092	CABLE ASSY	2
1	1020093	CABLE ASSY	1

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
1020010	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-495
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

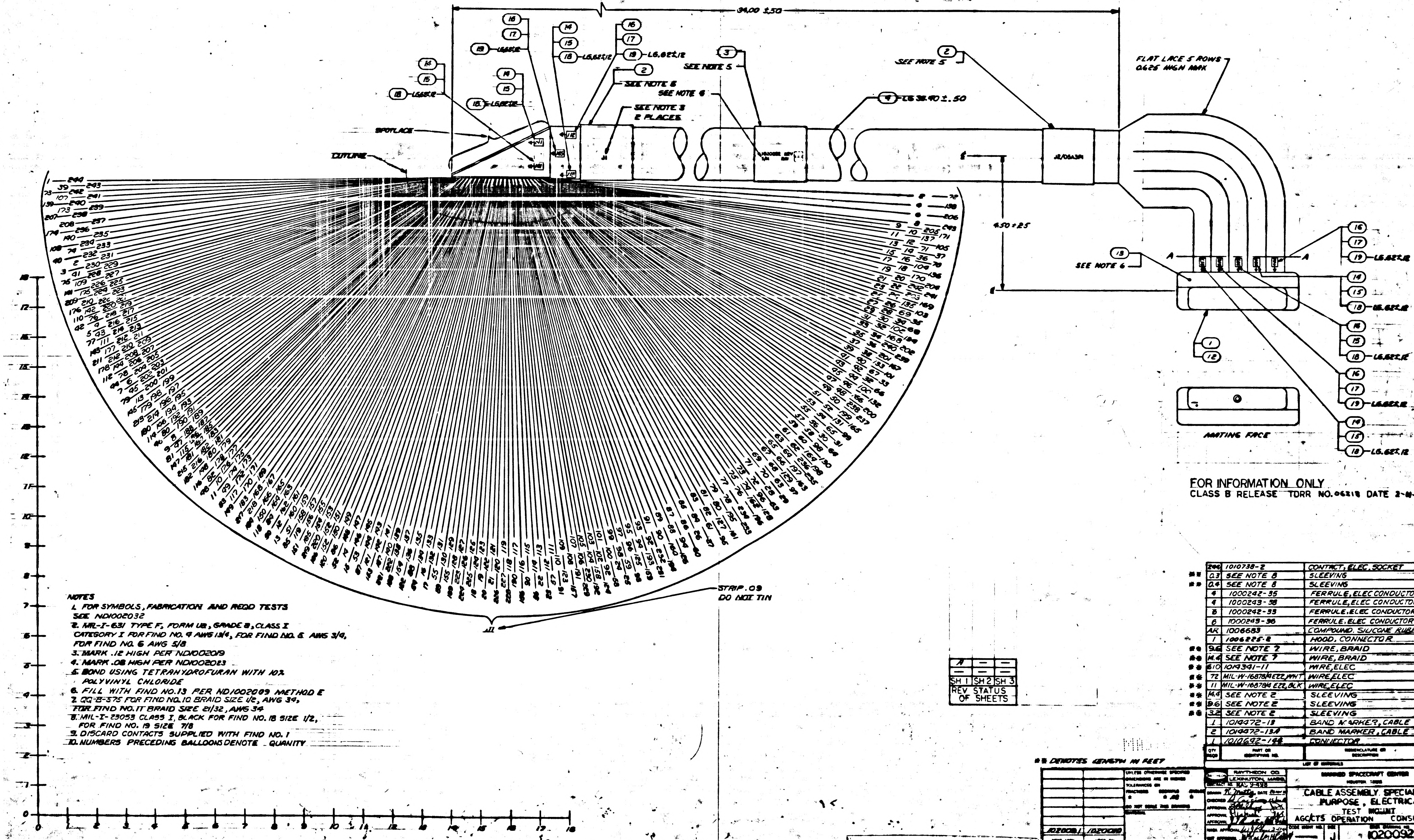
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE & BRACKET ASSY
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020091
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06318	2-11-64	
A	CHANGED PER TDRR 10453 DR. CHK APPR		


34.00 ±.50
16
17
19 — LG.62±.12
14
15
18 — LG.62±.12
2
SEE NOTE 6
SEE NOTE 3
2 PLACES
3
SEE NOTE 5
SEE NOTE 4
4 — LG 38.90 ±.50
2
SEE NOTE 5
FLAT LACE 5 ROWS
0.625 HIGH MAX
J1
J2/06A3P1
SPOTLACE
CUTLINE
4.50 ±.25
A
A
13
SEE NOTE 6
1
12
MATING FACE
STRIP .09
DO NOT TIN
11

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-11-64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE B, CLASS I CATEGORY I FOR FIND NO. 4 AWG 13/4, FOR FIND NO. 5 AWG 3/4, FOR FIND NO. 6 AWG 5/8
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO.13 PER ND1002009 METHOD E
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 11 BRAID SIZE 21/32, AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2, FOR FIND NO. 19 SIZE 7/8
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

A	—	—
—	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	240	1010738-2	CONTACT, ELEC, SOCKET	20
**	0.3	SEE NOTE 8	SLEEVING	19
**	0.4	SEE NOTE 8	SLEEVING	18
	4	1000242-35	FERRULE, ELEC CONDUCTOR	17
	4	1000243-38	FERRULE, ELEC CONDUCTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	AR	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006225-2	HOOD, CONNECTOR	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1014341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4 E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4 E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	3.2	SEE NOTE 2	SLEEVING	4
	1	1014472-13	BAND MARKER, CABLE	3
	2	1014472-13A	BAND MARKER, CABLE	2
	1	1010692-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

1020091	1020089
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

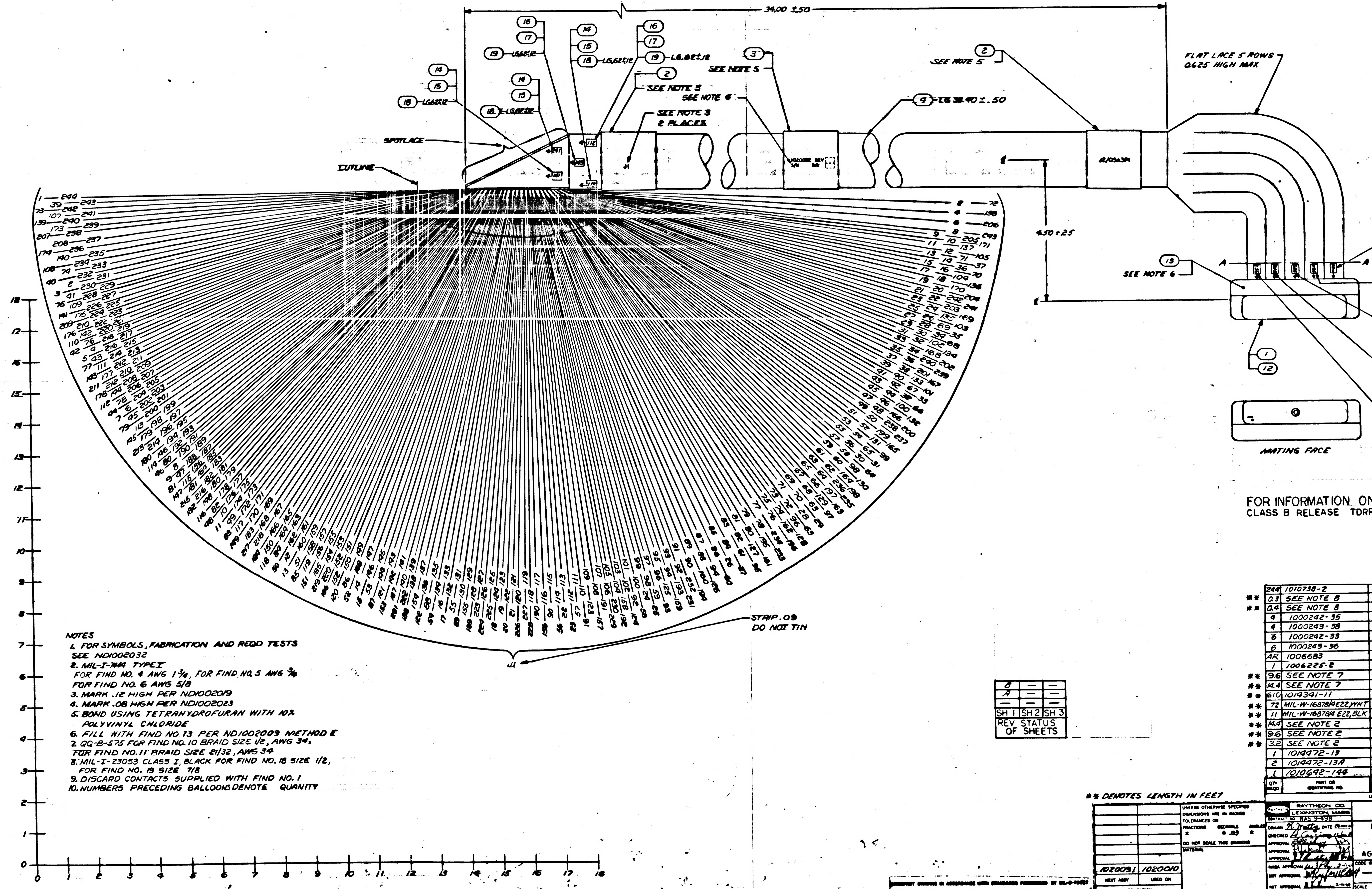
DRAWN K. Mutty DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL
UNIT APPROVAL

CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
1020092
SCALE 1/1
SHEET 1 OF 3

1020035

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06318		
A	CHANGED PER TDRR 10453 DR. W. Daum CHK. A.G.C APPD. J. Kenley	24 June 64	KC
B	CHANGED PER TDRR 10 984 DR. J.J.2. Small CHK. J.C.J. APPD S. Kenley	24 Jun 64	RB



NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-7444 TYPE I FOR FIND NO. 4 AWG 1 3/4, FOR FIND NO. 5 AWG 3/4 FOR FIND NO. 6 AWG 5/8
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO.13 PER ND1002009 METHOD E
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2, AWG 34, FOR FIND NO.11 BRAID SIZE 21/32, AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2, FOR FIND NO. 19 SIZE 7/8
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-14-64

B	—	—
A	—	—
—	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-2	CONTACT, ELEC, SOCKET	20
**	0.3	SEE NOTE 8	SLEEVING	19
**	0.4	SEE NOTE 8	SLEEVING	18
	4	1000242-35	FERRULE, ELEC CONDUCTOR	17
	4	1000243-38	FERRULE, ELEC CONDUCTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	AR	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006225-2	HOOD, CONNECTOR	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1019341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4 E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	3.2	SEE NOTE 2	SLEEVING	4
	1	1014472-13	BAND MARKER, CABLE	3
	2	1014472-13A	BAND MARKER, CABLE	2
	1	1010692-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

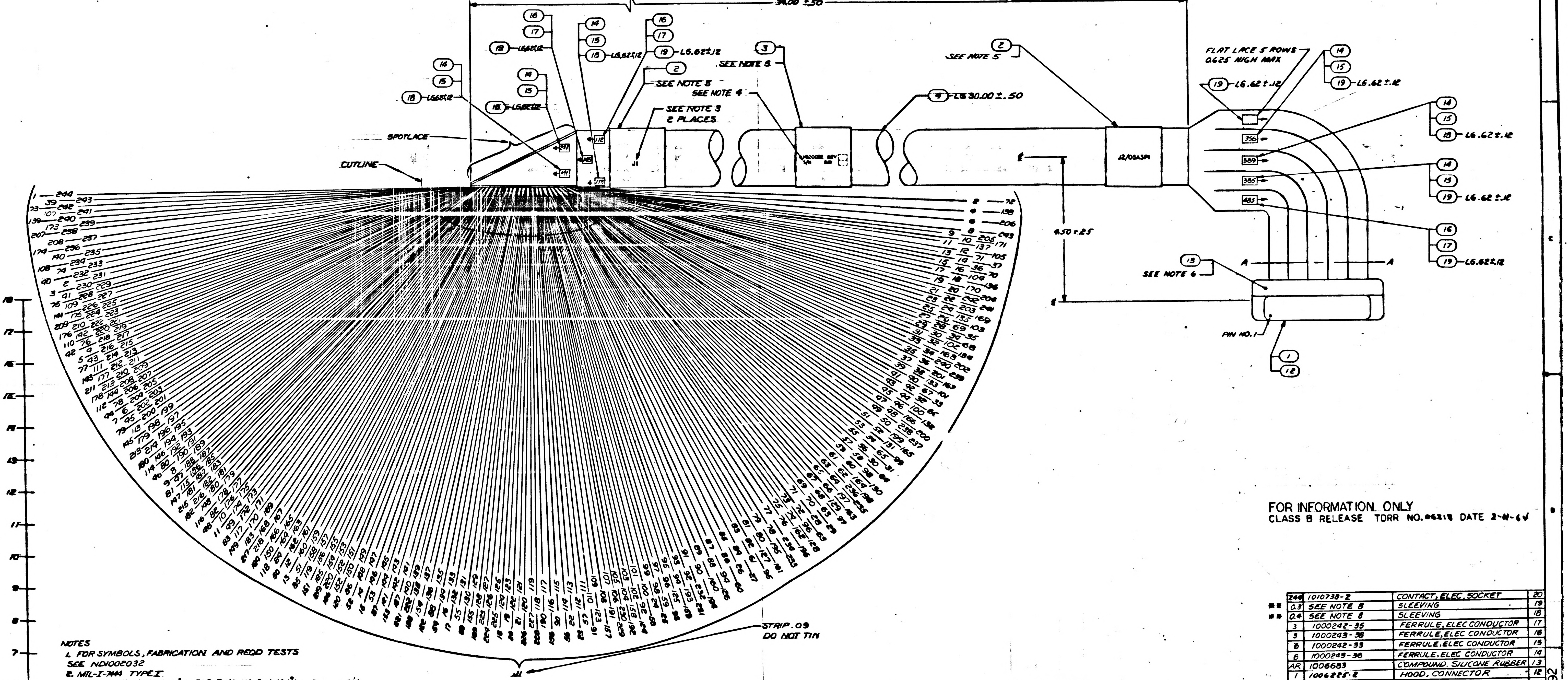
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN K. Matty DATE 20 Nov 63
CHECKED A. Cossi
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-14-64
MIT APPROVAL
MIT APPROVAL 2-14-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020092
SCALE 1/1 WT SHEET 1 OF 3

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06218	2-11-64	
A	CHANGED PER TDRR 10453 DR. W. Dunn CHK Q.B.C APPD	24 June 64	KCO
B	CHANGED PER TDRR 10984 DR. J.J. Gowell CHK. JCJ APPD	24 Jun 64	TB
C	CHANGED-PER TDRR 12242 DR. R. [illegible] CHK JCJ APPD	16 SEP. 64	KCO


34.00 ±.50
16
17
19 L6.62±.12
14
15
18 L6.62±.12
2
SEE NOTE 5
SEE NOTE 3
2 PLACES
3
SEE NOTE 5
SEE NOTE 4
4 L6 30.00±.50
2
SEE NOTE 5
SPOTLACE
CUTLINE
J1
J2/05A3P1
FLAT LACE 5 ROWS
0.625 HIGH MAX
19 L6.62±.12
14
15
18 L6.62±.12
19 L6.62±.12
16
17
19 L6.62±.12
356
389
385
485
4.50±.25
A
A
13
SEE NOTE 6
PIN NO. 1
1
12
STRIP .09
DO NOT TIN
J1

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-7444 TYPE I
FOR FIND NO. 4 AWG 1 3/4, FOR FIND NO. 5 AWG 3/4
FOR FIND NO. 6 AWG 5/8
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO.13 PER ND1002009 METHOD E
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2, AWG 34,
FOR FIND NO. 11 BRAID SIZE 21/32, AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2,
FOR FIND NO. 19 SIZE 7/8
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06218 DATE 2-11-64

C	—	—
B	—	—
A	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-2	CONTACT, ELEC, SOCKET	20
**	0.3	SEE NOTE 8	SLEEVING	19
**	0.4	SEE NOTE 8	SLEEVING	18
	3	1000242-35	FERRULE, ELEC CONDUCTOR	17
	3	1000243-38	FERRULE, ELEC CONDUCTOR	16
	8	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	AR	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006225-2	HOOD, CONNECTOR	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1019341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4 E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4 E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	2.7	SEE NOTE 2	SLEEVING	4
	1	1019472-13	BAND MARKER, CABLE	3
	2	1019472-13A	BAND MARKER, CABLE	2
	1	1010692-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020031	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Motty DATE 20 Jan 64
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL 2-4-64

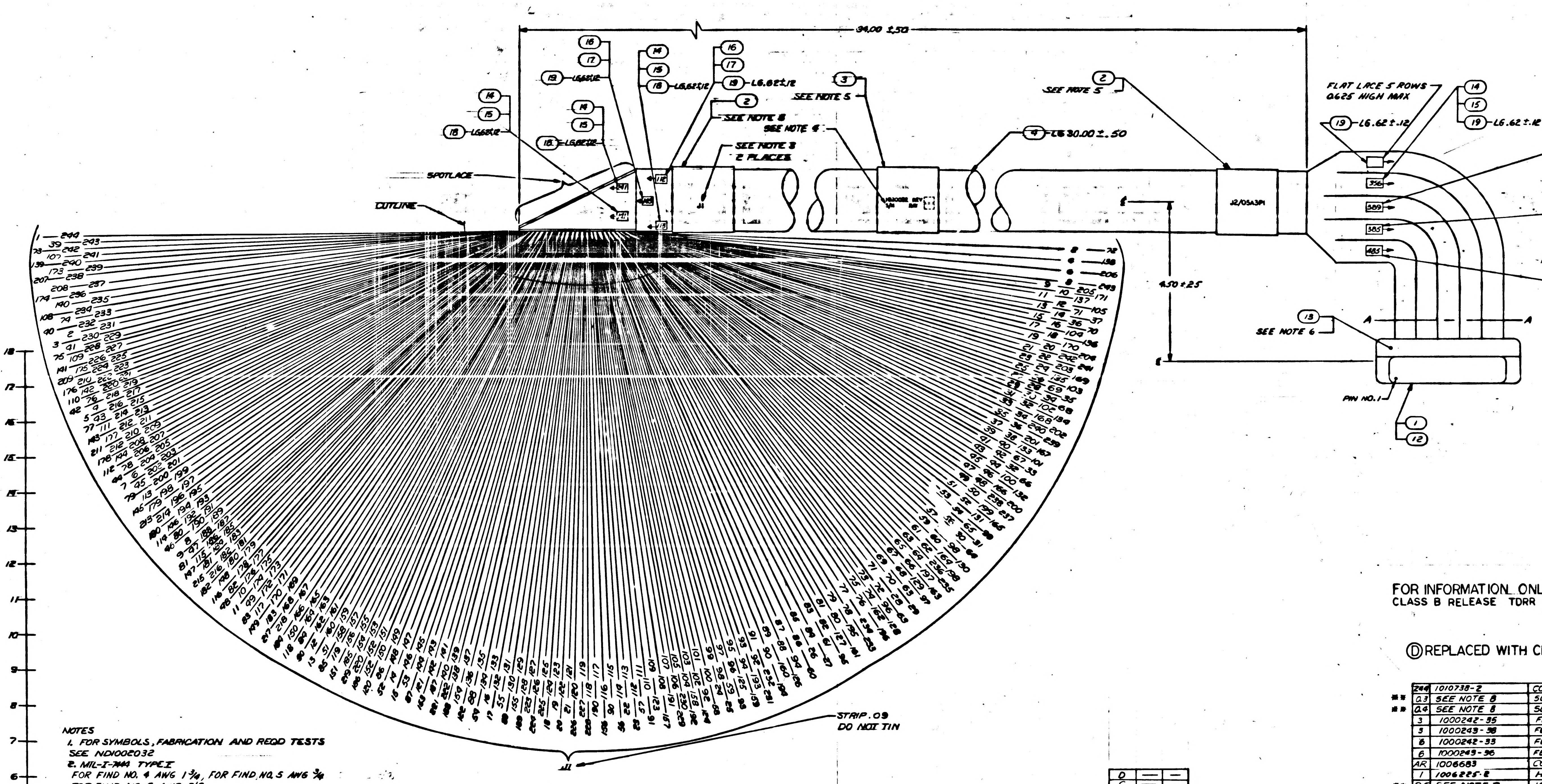
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY SPECIAL PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO 1020092
SCALE 1/1 WT SHEET 1 OF 3

1020092

SYM	DESCRIPTION	DATE	APPROVED
—	CC B RELEASED PER TDRR06318	2-4-64	
A	CHANGED PER TDRR 10453 DR. CHK A.G.C APPD	24 June 64	KCO
B	CHANGED PER TDRR 10984 DR. CHK. J.C.J APPD	64	70
C	CHANGED PER TDRR 12242 DR. CHK APPD	64	KCO
D	REPLACED WITH CHANGES BY REV E PER TDRR 15999 DR J.P. Leonard CHK APPD	3 Mar 65	



NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-7444 TYPE I
FOR FIND NO. 4 AWG 1 3/4, FOR FIND NO. 5 AWG 3/4
FOR FIND NO. 6 AWG 5/8
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO.13 PER ND1002009 METHOD E
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2, AWG 34,
FOR FIND NO. 11 BRAID SIZE 21/32, AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2,
FOR FIND NO. 19 SIZE 7/8
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-11-64

Ⓓ REPLACED WITH CHANGE BY REV E

D	—	—
C	—	—
B	—	—
A	—	—
—	—	—
SH 1	SH 2	SH 3
REV STATUS OF SHEETS		

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-2	CONTACT, ELEC, SOCKET	20
**	0.3	SEE NOTE 8	SLEEVING	19
**	0.4	SEE NOTE 8	SLEEVING	18
	3	1000242-35	FERRULE, ELEC CONDUCTOR	17
	3	1000243-38	FERRULE, ELEC CONDUCTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	AR	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006225-2	HOOD, CONNECTOR	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1019341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4 E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4 E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	2.7	SEE NOTE 2	SLEEVING	4
	1	1019472-13	BAND MARKER, CABLE	3
	2	1019472-13A	BAND MARKER, CABLE	2
	1	1010692-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

1020091	1020010
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Motty DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

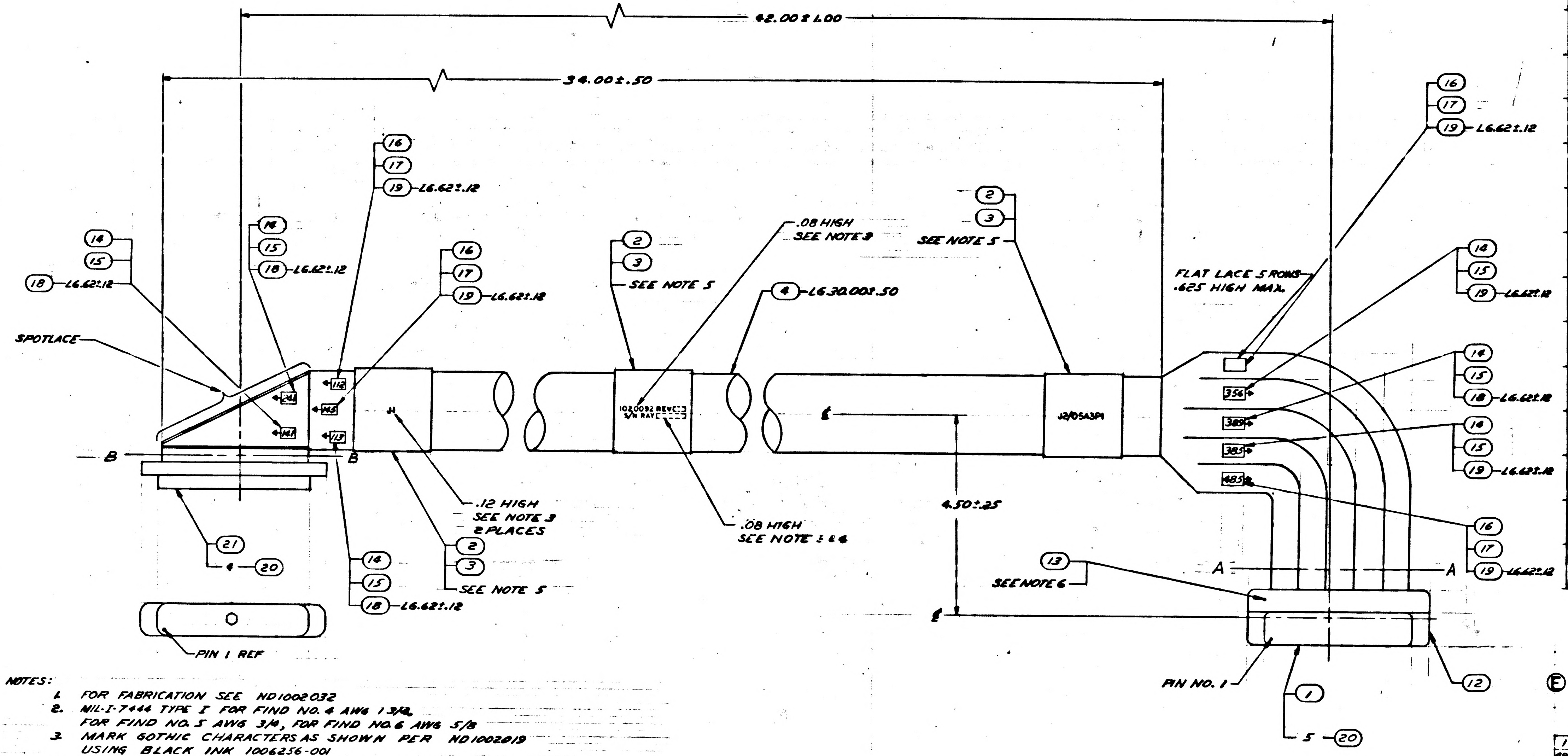
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020092
SCALE 1/1 WT SHEET 1 OF 3

1020092

SYM	REVISIONS DESCRIPTION 0631F	DATE	APPROVED
E	REPLACES REV. D WITH CHANGE PER TDRR 15??? APPD		


42.00±1.00
34.00±.50
SPOTLACE
14
15
18 — L6.62±.12
14
15
18 — L6.62±.12
16
17
19 — L6.62±.12
16
17
19 — L6.62±.12
112
141
145
141
113
B
B
J1
.12 HIGH SEE NOTE 3 2 PLACES
2
3
SEE NOTE 5
21
4 — 20
14
15
18 — L6.62±.12
PIN 1 REF
2
3
SEE NOTE 5
.08 HIGH SEE NOTE 3
1020092 REV[ ] S/N RAY[ ]
4 — L6 30.00±.50
.08 HIGH SEE NOTE 3 & 4
2
3
SEE NOTE 5
J2/05A3P1
4.50±.25
13
SEE NOTE 6
FLAT LACE 5 ROWS .625 HIGH MAX.
16
17
19 — L6.62±.12
14
15
19 — L6.62±.12
14
15
18 — L6.62±.12
14
15
19 — L6.62±.12
16
17
19 — L6.62±.12
356
389
385
485
A
A
PIN NO. 1
1
5 — 20
12

Ⓔ REPLACES REV D WITH CHANGE

NOTES:

1. FOR FABRICATION SEE ND1002032
2. MIL-I-7444 TYPE I FOR FIND NO. 4 AWG 1 3/8, FOR FIND NO. 5 AWG 3/4, FOR FIND NO. 6 AWG 5/8
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. SERIALIZE PER ND 1002023
5. BOND USING FIND NO. 3
6. FILL WITH FIND NO. 13 PER ND1002009 METHOD E AFTER TEST
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2 AWG 34, FOR FIND NO. 11 BRAID SIZE 21/32 AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2, FOR FIND NO. 19 SIZE 7/8
9. CRIMP PER ND1002206
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	1	1010816-244	CONNECTOR	21
	488	1010278-2	CONTACT, ELEC, SOCKET	20
**	0.6	SEE NOTE 8	SLEEVING	19
**	0.6	SEE NOTE 8	SLEEVING	18
	4	1000242-35	FERRULE, ELEC CONDUTOR	17
	4	1000243-38	FERRULE, ELEC CONDUTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	A/R	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006232-2	SHELL, POTTING ELEC CONN, 90°	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1014341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	2.6	SEE NOTE 2	SLEEVING	5
**	2.7	SEE NOTE 2	SLEEVING	4
	A/R	1006253	ADHESIVE	3
	3	1014472-13A	BAND MARKER, CABLE	2
	1	1010816-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

E	E	E	E
SHT 1	SHT 2	SHT 3	SHT 4

REV STATUS OF SHEETS

NEXT ASSY	USED ON
1020091	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ±.12
DECIMALS .XXX ±
ANGLES ±
DO NOT SCALE DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. FNP-12775
DRAWN — DATE
CHECKED
APPROVAL 1/27/65
APPROVAL H. Moran 27 JAN 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 2/2/65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

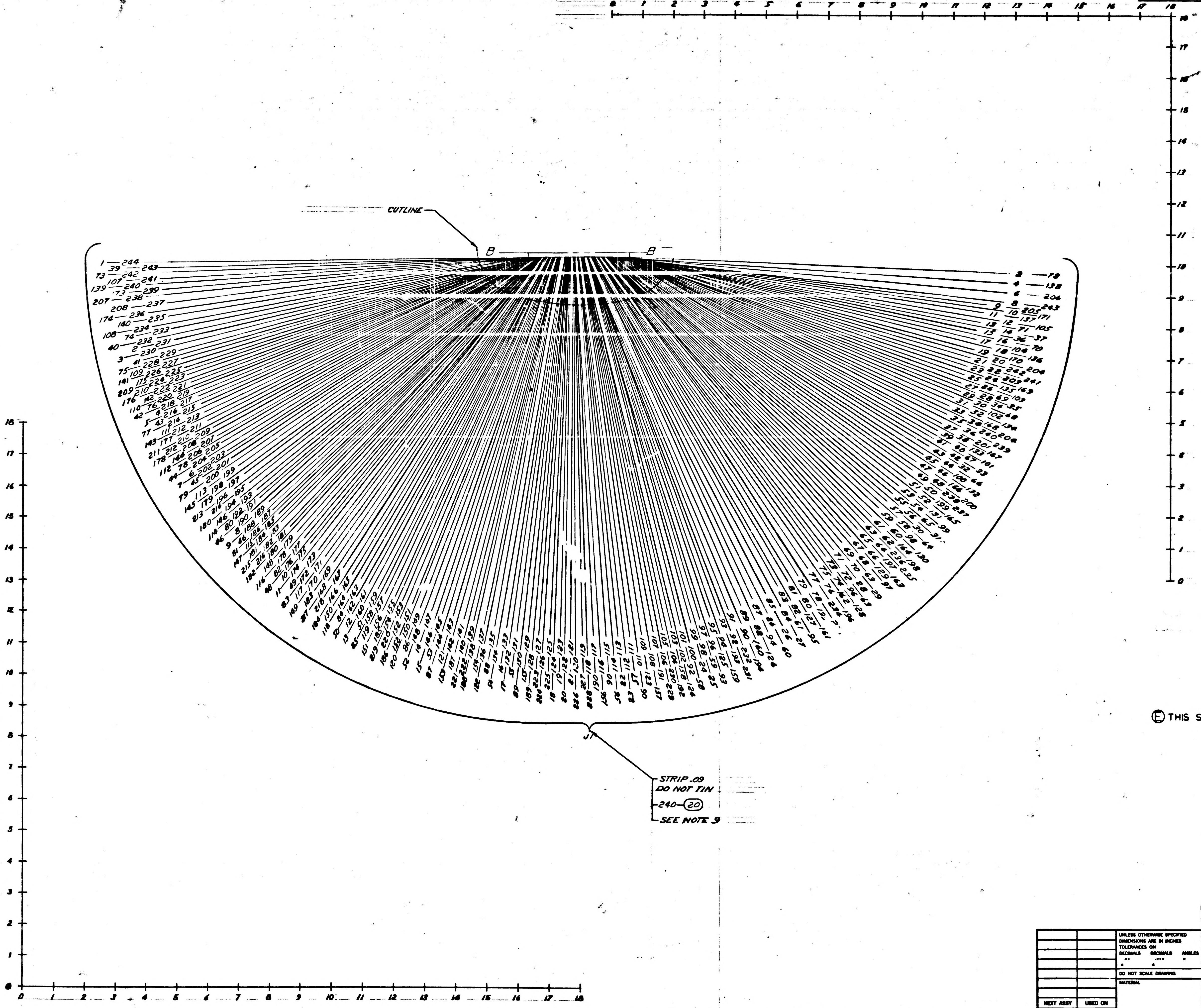
CABLE ASSEMBLY SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020092
SCALE 1/1 WT SHEET 1 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020092 E

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS 06317			
E	THIS SHEET ADDED PER JDRR 15971 APPD		



Ⓔ THIS SHEET ADDED

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ± DECIMALS .XXX ± ANGLES ±
DO NOT SCALE DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. FNP-12775
DRAWN DATE
CHECKED
APPROVAL 27 JAN 65
APPROVAL 1/22/65
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

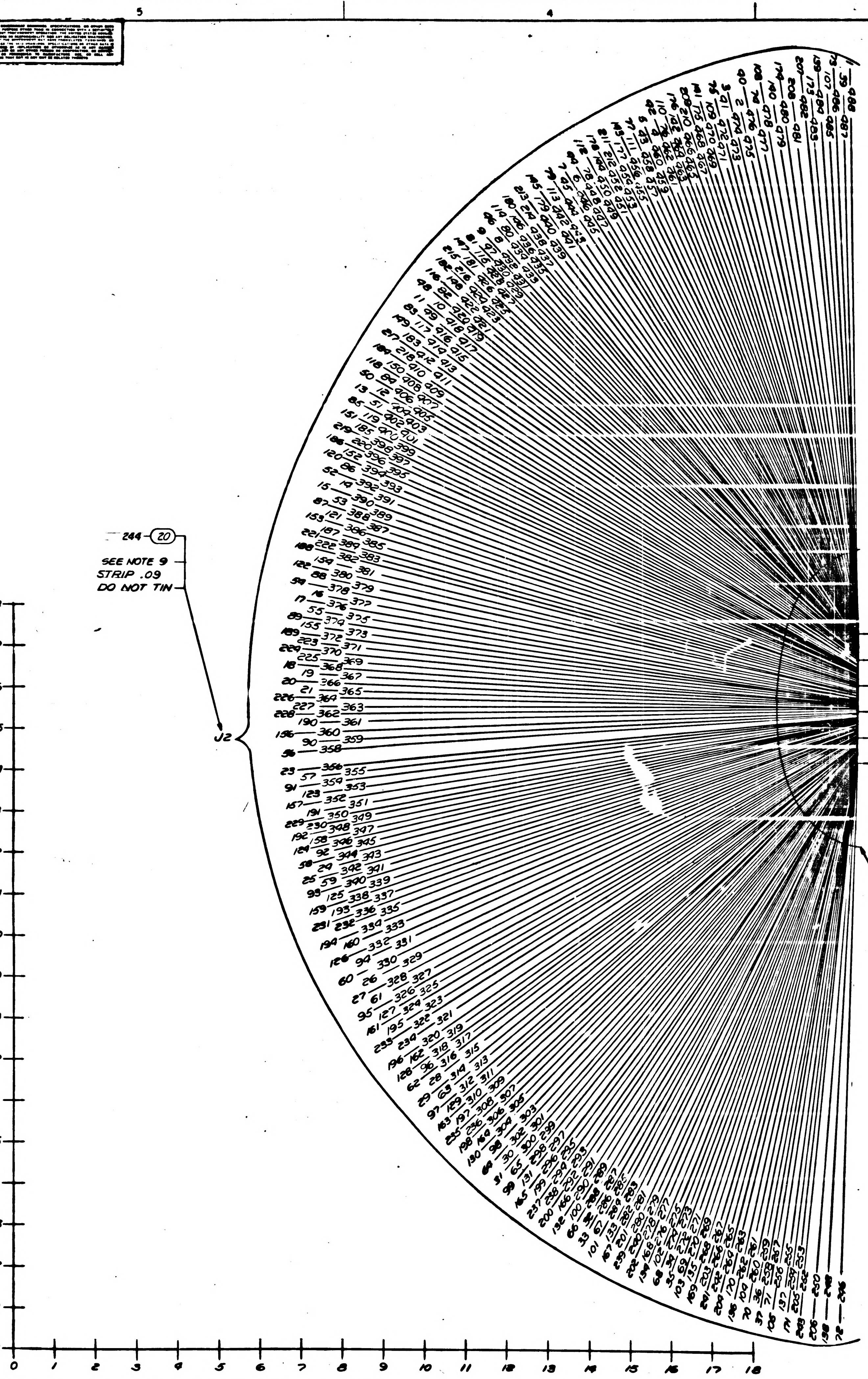
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

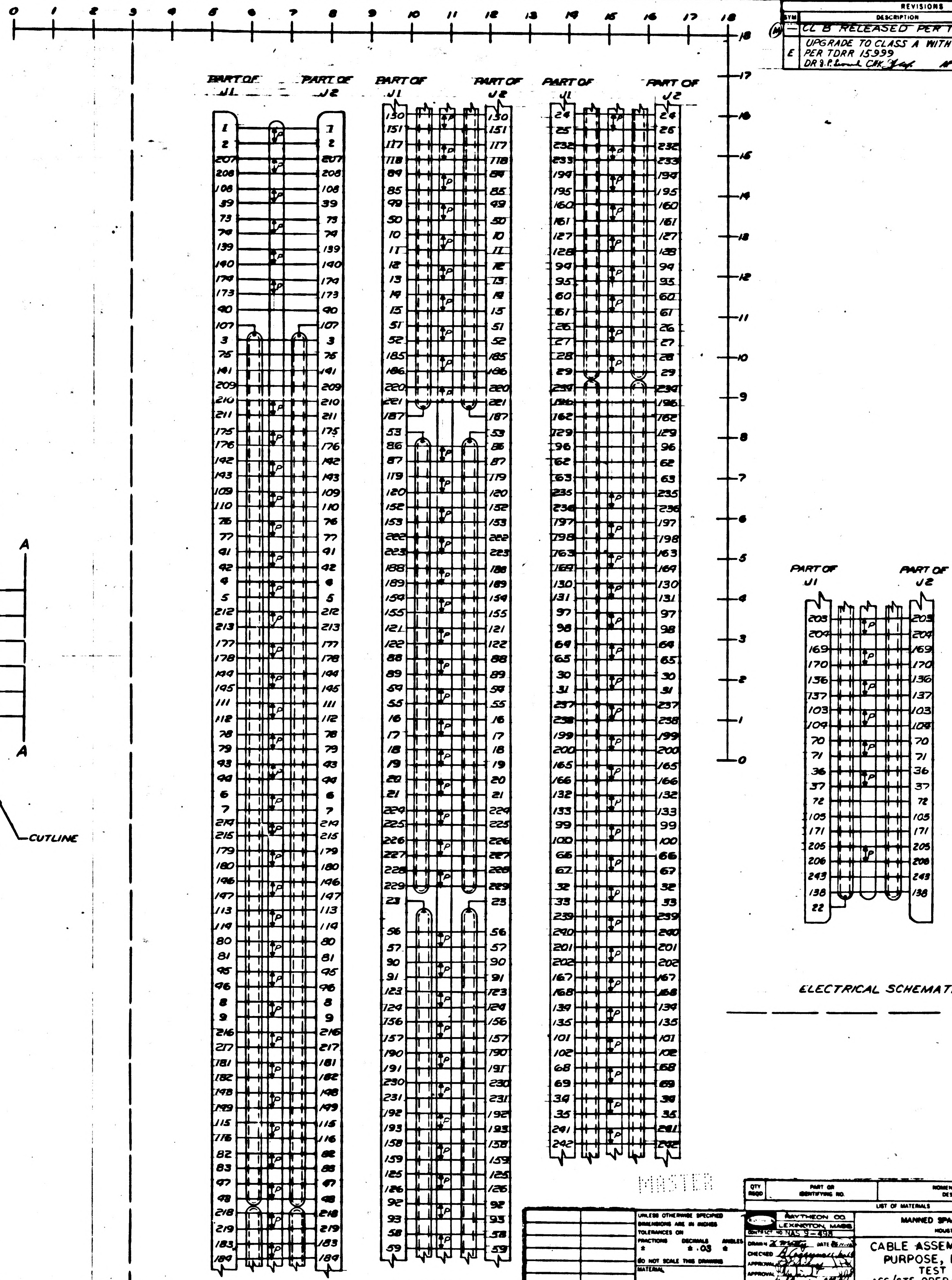
CABLE ASSEMBLY SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020092
SCALE 1/1 WT SHEET 2 OF 6

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06318	1-11-64	
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 15999 DR J.P. Leonard CHK. APPD	3 Mar 65	





ELECTRICAL SCHEMATIC

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE 26 Nov
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020092
SCALE 1/1 WT SHEET 3 OF 4

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
—	CLB RELEASE PER TDRR 06518		
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 15999 DR J.P. CHK APPD	3 MAR 65	KB

1020092 E

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	244	WHT	22	9	488	
	231	BLK			475	
	238	WHT	22	9	482	
	237	BLK			481	
	234	WHT	22	9	478	
	243	BLK			487	
	242	WHT	22	9	486	
	233	BLK			477	
	240	WHT	22	9	484	
	235	BLK			479	
	236	WHT	22	9	480	
	239	BLK			483	
	232	WHT	22	8	476	
	230	WHT	22	8	474	ATTACH FIND NO. 5 AND 11. LG 57.6 ±.6
	228	WHT	22	8	472	
	226	WHT	22	8	470	
	224	WHT	22	8	468	
	223	WHT	22	9	467	
	210	BLK			454	
	225	WHT	22	9	469	
	222	BLK			466	
	221	WHT	22	9	465	
	212	BLK			456	
	227	WHT	22	9	471	
	220	BLK			464	
	219	WHT	22	9	463	
	214	BLK			458	
	229	WHT	22	9	473	
	218	BLK			462	
	217	WHT	22	9	461	
	216	BLK			460	
	209	WHT	22	9	453	
	196	BLK			440	
	211	WHT	22	9	455	
	208	BLK			452	
	207	WHT	22	9	451	
	198	BLK			442	
	213	WHT	22	9	457	
	206	BLK			450	
	205	WHT	22	9	449	
	200	BLK			444	
	215	WHT	22	9	459	
	204	BLK			448	
	203	WHT	22	9	447	
	202	BLK			446	
	195	WHT	22	9	439	
	182	BLK			426	
	197	WHT	22	9	441	
	194	BLK			438	
	193	WHT	22	9	437	
	184	BLK			428	
	199	WHT	22	9	443	
	192	BLK			436	
	191	WHT	22	9	435	
	186	BLK			430	
	201	WHT	22	9	445	
	190	BLK			434	
	189	WHT	22	9	433	
	188	BLK			432	
	181	WHT	22	9	425	
	168	BLK			412	
	183	WHT	22	9	427	
	180	BLK			424	
	179	WHT	22	9	423	
	170	BLK			414	
	185	WHT	22	9	429	
	178	BLK			422	
	177	WHT	22	9	421	
	172	BLK			416	
	187	WHT	22	9	431	
	176	BLK			420	
*	241	SHIELD			485	*
	167	WHT	22	9	411	ATTACH FIND NO. 6 AND 10. LG526 ±.5
	154	BLK			398	
	169	WHT	22	9	413	
	166	BLK			410	
	165	WHT	22	9	409	
	156	BLK			400	
	171	WHT	22	9	415	
	164	BLK			408	
	163	WHT	22	9	407	
	158	BLK			402	
	173	WHT	22	9	417	
	162	BLK			406	

*ATTACH FIND NO.7 LG 9.0±.12

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	175	WHT	22	9	419	ATTACH FIND NO.6 AND 10. LG 57.6±.5
	174	BLK			418	
	161	WHT	22	9	405	
	160	BLK			404	
	147	WHT	22	9	391	
	146	BLK			390	
	159	WHT	22	9	403	
	148	BLK			392	
	155	WHT	22	9	399	
	152	BLK			396	
	153	WHT	22	9	397	
	140	BLK			384	
*	141	SHIELD			385	*
	149	WHT	22	9	393	
	144	BLK			388	
	157	WHT	22	9	401	
	150	BLK			394	
	151	WHT	22	9	395	
	142	BLK			386	
	139	WHT	22	9	383	
	127	BLK			371	
	138	WHT	22	9	382	
	128	BLK			372	
	137	WHT	22	9	381	
	129	BLK			373	
	143	WHT	22	9	387	
	136	BLK			380	
	135	WHT	22	9	379	
	130	BLK			374	
	134	WHT	22	9	378	
	131	BLK			375	
	133	WHT	22	9	377	
	132	BLK			376	
	124	WHT	22	9	368	
	123	BLK			367	
	122	WHT	22	9	366	
	121	BLK			365	
	126	WHT	22	9	370	
	125	BLK			369	
	120	WHT	22	9	364	
	119	BLK			363	
	118	WHT	22	9	362	
	106	BLK			350	
*	145	SHIELD			389	*
	114	WHT	22	9	358	ATTACH FIND NO.5 AND 11 LG 57.6±.5
	111	BLK			355	
	115	WHT	22	9	359	
	110	BLK			354	
	109	WHT	22	9	353	
	102	BLK			346	
	116	WHT	22	9	360	
	108	BLK			352	
	117	WHT	22	9	361	
	107	BLK			351	
	105	WHT	22	9	349	
	92	BLK			336	
	104	WHT	22	9	348	
	93	BLK			337	
	103	WHT	22	9	347	
	94	BLK			338	
	95	WHT	22	9	339	
	88	BLK			332	
	101	WHT	22	9	345	
	96	BLK			340	
	100	WHT	22	9	344	
	97	BLK			341	
	99	WHT	22	9	343	
	98	BLK			342	
	91	WHT	22	9	335	
	78	BLK			322	
	90	WHT	22	9	334	
	79	BLK			323	
	89	WHT	22	9	333	
	80	BLK			324	
	81	WHT	22	9	325	
	74	BLK			318	
	87	WHT	22	9	331	
	82	BLK			326	
	86	WHT	22	9	330	
	83	BLK			327	
	85	WHT	22	9	329	
	84	BLK			328	
	71	WHT	22	9	315	
	70	BLK			314	
*	112	SHIELD			356	*

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	77	WHT	22	8	321	ATTACH FIND NO.6 AND 10 LG 57.6±.5
	76	↕	↕	↕	320	
	75				319	
	67				311	
	73				317	
	72				316	
	69	WHT	22	8	313	
	64	WHT	22	9	308	
	63	BLK			307	
	65	WHT	22	9	309	
	62	BLK			306	
	66	WHT	22	9	310	
	61	BLK			305	
	60	WHT	22	9	304	
	53	BLK			297	
	68	WHT	22	9	312	
	59	BLK			303	
	58	WHT	22	9	302	
	55	BLK			299	
	57	WHT	22	9	301	
	56	BLK			300	
	50	WHT	22	9	294	
	49	BLK			293	
	51	WHT	22	9	295	
	48	BLK			292	
	52	WHT	22	9	296	
	47	BLK			291	
	46	WHT	22	9	290	
	39	BLK			283	
	54	WHT	22	9	298	
	45	BLK			289	
	44	WHT	22	9	288	
	41	BLK			285	
	43	WHT	22	9	287	
	42	BLK			286	
	36	WHT	22	9	280	
	35	BLK			279	
	37	WHT	22	9	281	
	34	BLK			278	
	38	WHT	22	9	282	
	33	BLK			277	
	32	WHT	22	9	276	
	25	BLK			269	
	40	WHT	22	9	284	
	31	BLK			275	
	30	WHT	22	9	274	
	27	BLK			271	
	29	WHT	22	9	273	
	28	BLK			272	
	22	WHT	22	9	266	
	21	BLK			265	
	23	WHT	22	9	267	
	20	BLK			264	
	24	WHT	22	9	268	
	19	BLK			263	
	18	WHT	22	9	262	
	11	BLK			255	
	26	WHT	22	9	270	
	17	BLK			261	
	16	WHT	22	9	260	
	13	BLK			257	
	15	WHT	22	9	259	
	14	BLK			258	
*	113	SHLD				
	2	WHT	22	8	246	
	12	WHT	22	8	256	
	10	WHT	22	8	254	
	9	WHT	22	9	253	
	6	BLK			250	
	8	WHT	22	8	252	
	4	BLK		22	7	248	

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN P.S. Tracy DATE 20?
CHECKED A. Cassina 15
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-11-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

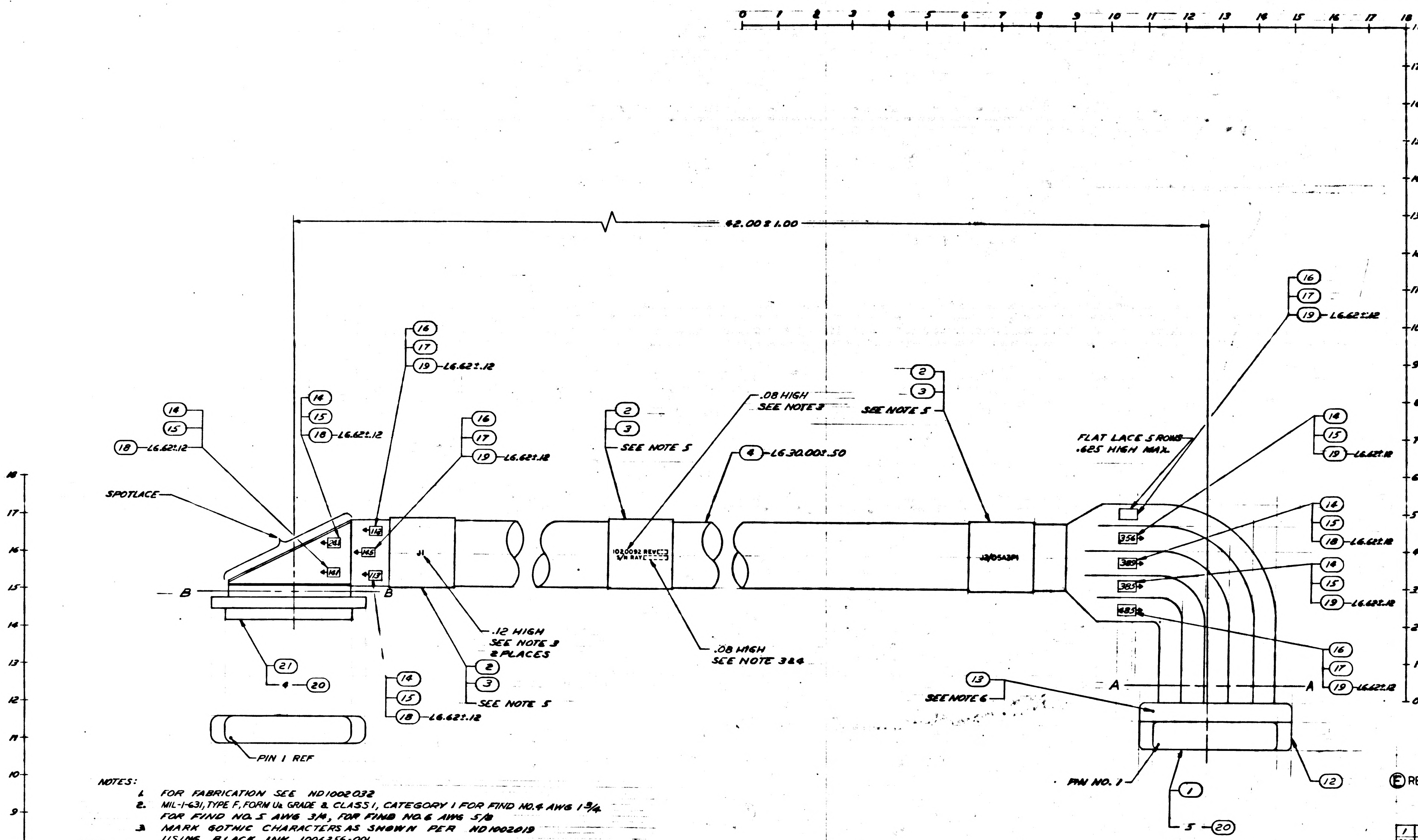
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO ——— SIZE J NASA DRAWING NO 1020092
SCALE NONE WT SHEET 4 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020092 E

SYM	DESCRIPTION 0631F	DATE	APPROVED
E	REPLACES REV. D WITH CHANGE PER TDRR 15999 APPD		
F	CHANGED PER TDRR 19718 DR CHK APPD	20 June 65	


42.00 ± 1.00
SPOTLACE
14
15
18 L6.62±.12
16
17
19 L6.62±.12
24Ʃ
16Ʃ
11Ʃ
14Ʃ
13Ʃ
B
J1
.12 HIGH
SEE NOTE 3
2 PLACES
2
3
SEE NOTE 5
21
4 — 20
PIN 1 REF
.08 HIGH
SEE NOTE 3
1020092 REV
S/N RAY
.08 HIGH
SEE NOTE 3&4
4 L6 30.00±.50
J2/05A3P1
FLAT LACE 5 ROWS
.625 HIGH MAX.
356
389
385
485
A
13
SEE NOTE 6
PIN NO. 1
1
5 — 20
12

NOTES:

1. FOR FABRICATION SEE ND1002032
2. MIL-I-631, TYPE F, FORM U2 GRADE A CLASS I, CATEGORY I FOR FIND NO. 4 AWG 1 3/4 FOR FIND NO. 5 AWG 3/4, FOR FIND NO. 6 AWG 5/8
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. SERIALIZE PER ND1002023
5. BOND USING FIND NO. 3
6. FILL WITH FIND NO. 13 PER ND1002009 METHOD E AFTER TEST
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2 AWG 34, FOR FIND NO. 11 BRAID SIZE 21/32 AWG 34
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1.00 ID, FOR FIND NO. 19 SIZE 1.50 ID
9. CRIMP PER ND1002206
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
11. AR DENOTES AS REQUIRED.

Ⓔ REPLACES REV D WITH CHANGE

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	1	1010816-244	CONNECTOR	21
	488	1010278-2	CONTACT, ELEC, SOCKET	20
**	0.4	SEE NOTE 8	SLEEVING	19
**	0.6	SEE NOTE 8	SLEEVING	18
	4	1000242-35	FERRULE, ELEC CONDUTOR	17
	4	1000243-38	FERRULE, ELEC CONDUTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	A/R	1006683	COMPOUND, SILICONE RUBBER	13
	1	1006232-2	SHELL, POTTING ELEC CONN 90°	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1014341-11	WIRE, ELEC	9
**	72	MIL-W-16878/4E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	2.7	SEE NOTE 2	SLEEVING	4
	A/R	1006253	ADHESIVE	3
	3	1014472-13A	BAND MARKER, CABLE	2
	1	1010818-144	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

1020091	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS .XX ±.12 DECIMALS .XXX ± ANGLES ±
DO NOT SCALE DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. FNP-12775
DRAWN DATE
CHECKED
APPROVAL
APPROVAL H. Moyer 27 JAN 65
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

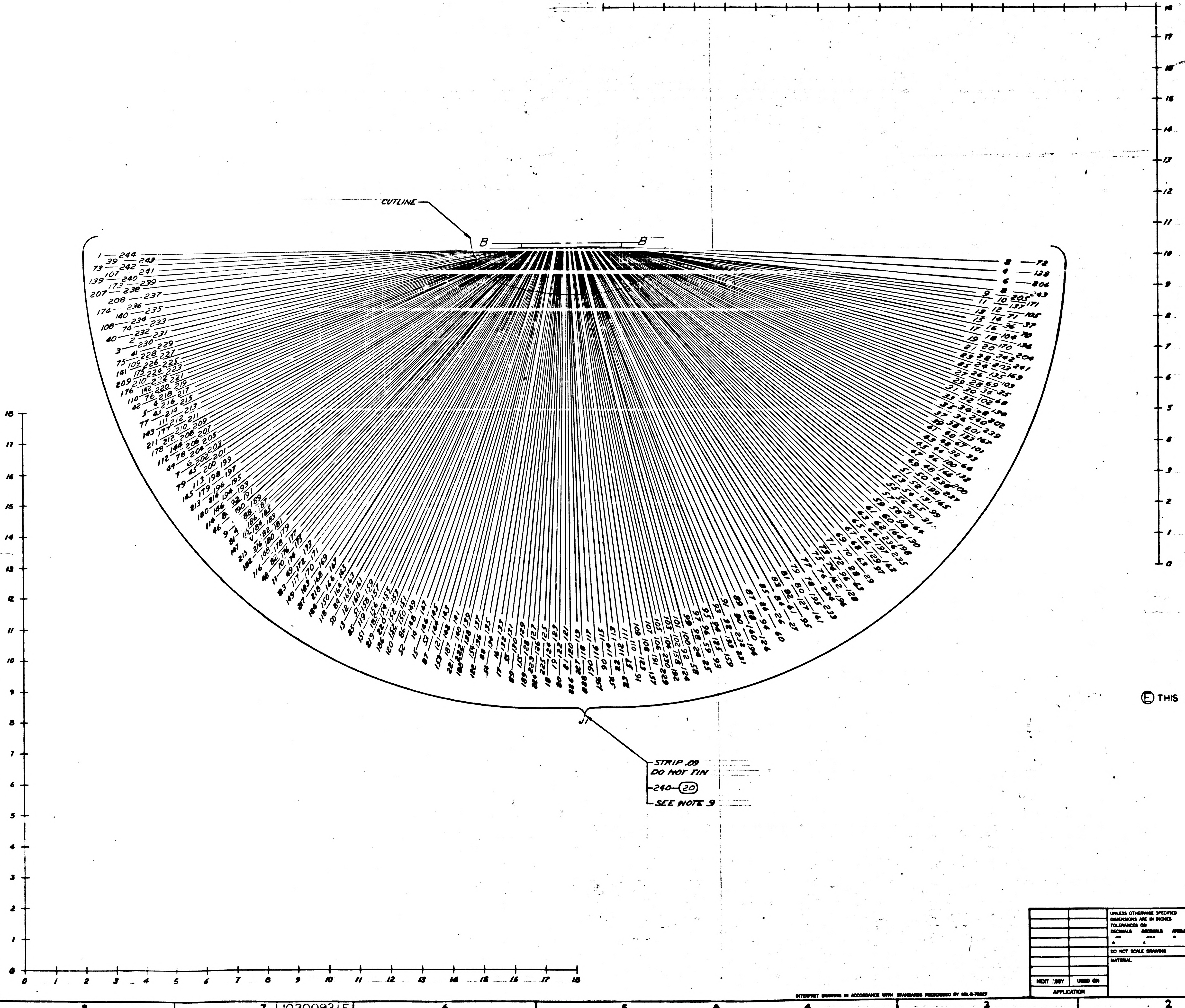
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. 49956
SIZE J
NASA DRAWING NO. 1020092
SCALE 1/1
WT
SHEET 1 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
E	THIS SHEET ADDED PER TDRR 15997 APPD		
F	CHANGED PER TDRR 19718 DR CHK APP	20 Jul 65	



Ⓔ THIS SHEET ADDED

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS .XX ± DECIMALS .XXX ± ANGLES ±
		DO NOT SCALE DRAWING
NEXT ASSY	USED ON	MATERIAL
APPLICATION		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. FNP-12775
DRAWN DATE
CHECKED 19 Nov 64
APPROVAL 27 JAN 65
APPROVAL 1/27/65
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

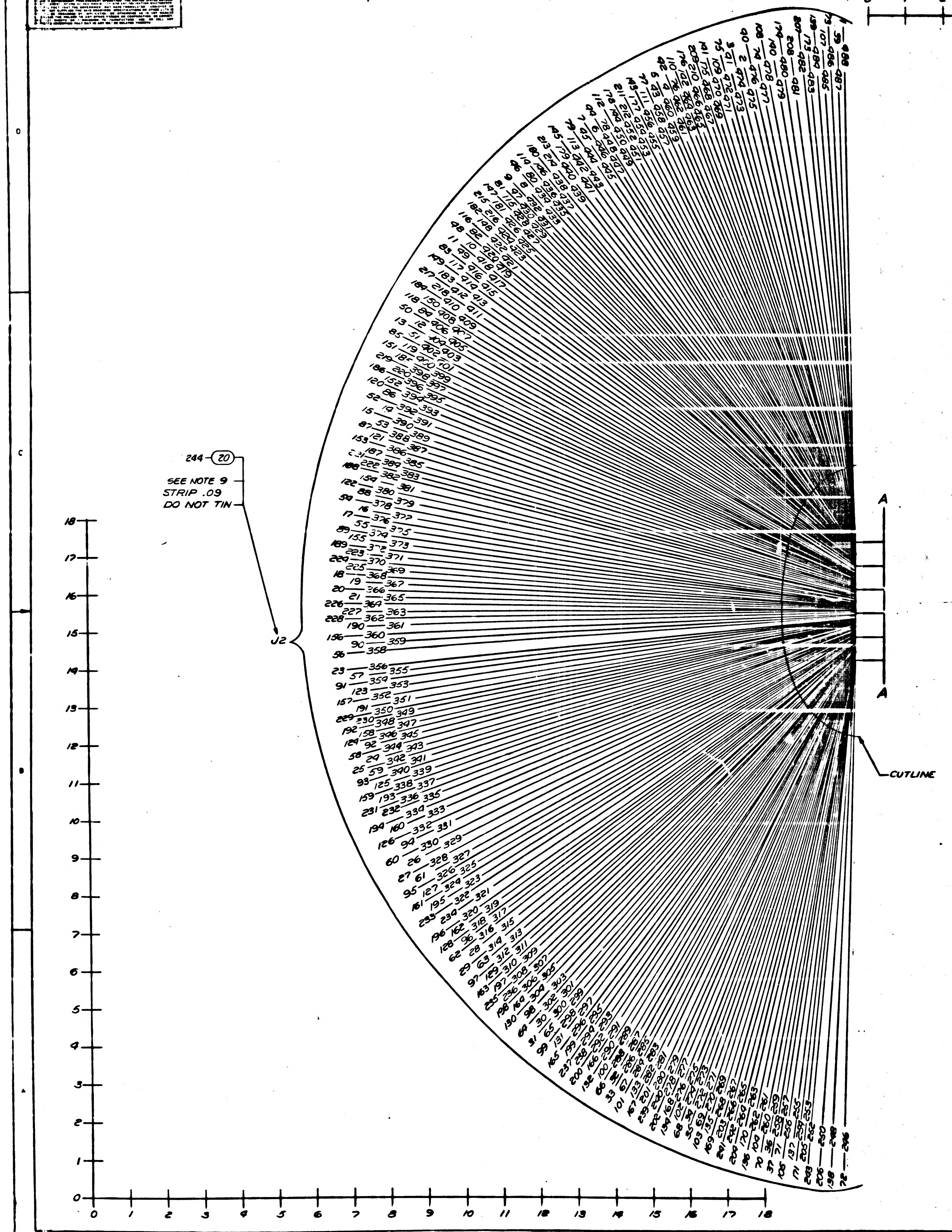
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

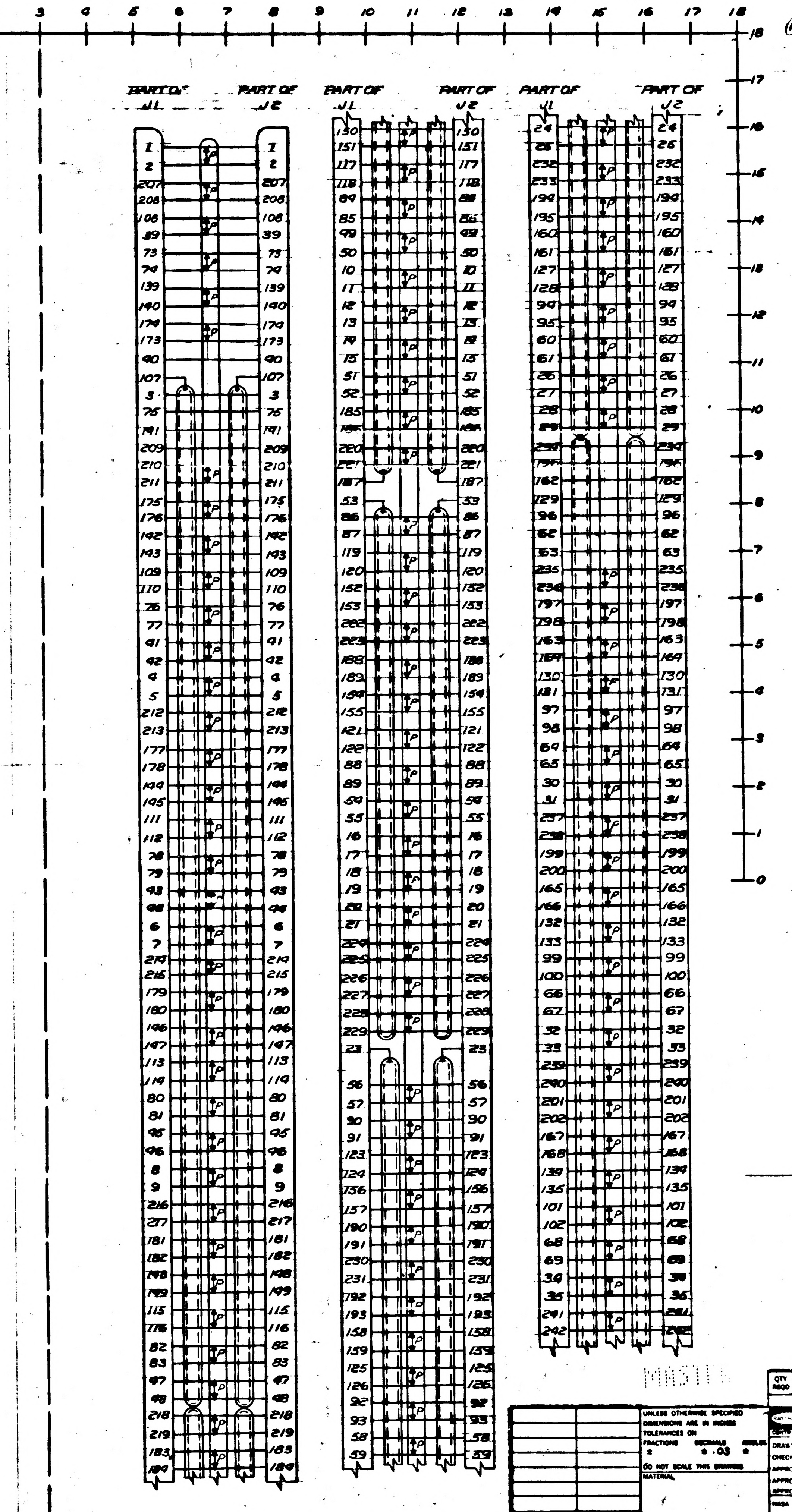
CABLE ASSEMBLY SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

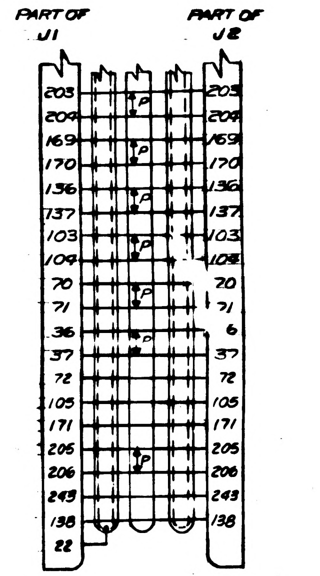
CODE IDENT NO. 49956
SIZE J
NASA DRAWING NO. 1020092
SCALE 1/1
WT
SHEET 2 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 16318	1-11-64	
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 15999 DR J.P. Leonard CHK J.A. APPD	3 MAR 65	NZB
F	CHANGED PER TDRR 19718 DR CHK APPD	20 June 65	


244 — 20
SEE NOTE 9
STRIP .09
DO NOT TIN
J2
A
A
CUTLINE


PART OF J1
PART OF J2
PART OF J1
PART OF J2
PART OF J1
PART OF J2
P


PART OF J1
PART OF J2

ELECTRICAL SCHEMATIC

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO 49956
SIZE J
NASA DRAWING NO 1020092
SCALE 1/1
WT
SHEET 3 OF 4

1020092 F

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR [illegible]	[illegible]	
E	UPGRADE TO CLASS A WITH CHANGE PER TDRR 15999 DR J.P. Leonard CHK [illegible] APPD [illegible]	3 MAR 65	KC
F	CHANGED PER TDRR 19718 DR [illegible] CHK [illegible] APPD [illegible]	26 JUNE 65	[illegible]

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	244	WHT	22	9	488	
	231	BLK			475	
	238	WHT	22	9	482	
	237	BLK			481	
	234	WHT	22	9	478	
	243	BLK			487	
	242	WHT	22	9	486	
	233	BLK			477	
	240	WHT	22	9	484	
	235	BLK			479	
	236	WHT	22	9	480	
	239	BLK			483	
	232	WHT	22	8	476	
	230	WHT	22	8	474	
	228	WHT	22	8	472	
	226	WHT	22	8	470	
	224	WHT	22	8	468	
	223	WHT	22	9	467	
	210	BLK			454	
	225	WHT	22	9	469	
	222	BLK			466	
	221	WHT	22	9	465	
	212	BLK			456	
	227	WHT	22	9	471	
	220	BLK			464	
	219	WHT	22	9	463	
	214	BLK			458	
	229	WHT	22	9	473	
	218	BLK			462	
	217	WHT	22	9	461	
	216	BLK			460	
	209	WHT	22	9	453	
	196	BLK			440	
	211	WHT	22	9	455	
	208	BLK			452	
	207	WHT	22	9	451	
	198	BLK			442	
	213	WHT	22	9	457	
	206	BLK			450	
	205	WHT	22	9	449	ATTACH FIND NO. 5 AND 11. LG 57.6 ±.6
	200	BLK			444	
	215	WHT	22	9	459	
	204	BLK			448	
	203	WHT	22	9	447	
	202	BLK			446	
	195	WHT	22	9	439	
	182	BLK			426	
	197	WHT	22	9	441	
	194	BLK			438	
	193	WHT	22	9	437	
	184	BLK			428	
	199	WHT	22	9	443	
	192	BLK			436	
	191	WHT	22	9	435	
	186	BLK			430	
	201	WHT	22	9	445	
	190	BLK			434	
	189	WHT	22	9	433	
	188	BLK			432	
	181	WHT	22	9	425	
	168	BLK			412	
	183	WHT	22	9	427	
	180	BLK			424	
	179	WHT	22	9	423	
	170	BLK			414	
	185	WHT	22	9	429	
	178	BLK			422	
	177	WHT	22	9	421	
	172	BLK			416	
	187	WHT	22	9	431	
	176	BLK			420	
*	241	SHIELD			485	*
	167	WHT	22	9	411	
	154	BLK			398	
	169	WHT	22	9	413	
	166	BLK			410	
	165	WHT	22	9	409	ATTACH FIND NO. 6 AND 10. LG 57.6 ±.5
	156	BLK			400	
	171	WHT	22	9	415	
	164	BLK			408	
	163	WHT	22	9	407	
	158	BLK			402	
	173	WHT	22	9	417	
	162	BLK			406	

* ATTACH FIND NO. 7 LG 4.0 ±.12

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	175	WHT	22	9	419	
	174	BLK			418	
	161	WHT	22	9	405	
	160	BLK			404	
	147	WHT	22	9	391	
	146	BLK			390	
	159	WHT	22	9	403	
	148	BLK			392	
	155	WHT	22	9	399	
	152	BLK			396	
	153	WHT	22	9	397	
	140	BLK			384	
*	141	SHIELD			385	*
	149	WHT	22	9	393	
	144	BLK			388	
	157	WHT	22	9	401	
	150	BLK			394	
	151	WHT	22	9	395	
	142	BLK			386	
	139	WHT	22	9	383	
	127	BLK			371	
	138	WHT	22	9	382	
	128	BLK			372	
	137	WHT	22	9	381	
	129	BLK			373	
	143	WHT	22	9	387	
	136	BLK			380	
	135	WHT	22	9	379	ATTACH FIND NO. 6 AND 10. LG 57.6 ±.5
	130	BLK			374	
	134	WHT	22	9	378	
	131	BLK			375	
	133	WHT	22	9	377	
	132	BLK			376	
	124	WHT	22	9	368	
	123	BLK			367	
	122	WHT	22	9	366	
	121	BLK			365	
	126	WHT	22	9	370	
	125	BLK			369	
	120	WHT	22	9	364	
	119	BLK			363	
	118	WHT	22	9	362	
	106	BLK			350	
*	145	SHIELD			389	*
	114	WHT	22	9	358	
	111	BLK			355	
	115	WHT	22	9	359	
	110	BLK			354	
	109	WHT	22	9	353	
	102	BLK			346	
	116	WHT	22	9	360	
	108	BLK			352	
	117	WHT	22	9	361	
	107	BLK			351	
	105	WHT	22	9	349	
	92	BLK			336	
	104	WHT	22	9	348	
	93	BLK			337	
	103	WHT	22	9	347	
	94	BLK			338	
	95	WHT	22	9	339	
	88	BLK			332	ATTACH FIND NO. 5 AND 11 LG 57.6 ±.6
	101	WHT	22	9	345	
	96	BLK			340	
	100	WHT	22	9	344	
	97	BLK			341	
	99	WHT	22	9	343	
	98	BLK			342	
	91	WHT	22	9	335	
	78	BLK			322	
	90	WHT	22	9	334	
	79	BLK			323	
	89	WHT	22	9	333	
	80	BLK			324	
	81	WHT	22	9	325	
	74	BLK			318	
	87	WHT	22	9	331	
	82	BLK			326	
	86	WHT	22	9	330	
	83	BLK			327	
	85	WHT	22	9	329	
	84	BLK			328	
	71	WHT	22	9	315	
	70	BLK			314	
*	112	SHIELD			356	*

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	77	WHT	22	8	321	
	76				320	
	75				319	
	67	↕	↕	↕	311	
	73				317	
	72				316	
	69	WHT	22	8	313	
	64	WHT	22	9	308	
	63	BLK			307	
	65	WHT	22	9	309	
	62	BLK			306	
	66	WHT	22	9	310	
	61	BLK			305	
	60	WHT	22	9	304	
	53	BLK			297	
	68	WHT	22	9	312	
	59	BLK			303	
	58	WHT	22	9	302	
	55	BLK			299	
	57	WHT	22	9	301	
	56	BLK			300	
	50	WHT	22	9	294	
	49	BLK			293	
	51	WHT	22	9	295	
	48	BLK			292	
	52	WHT	22	9	296	
	47	BLK			291	
	46	WHT	22	9	290	ATTACH FIND NO. 6 AND 10 LG 57.6 ±.5
	39	BLK			283	
	54	WHT	22	9	298	
	45	BLK			289	
	44	WHT	22	9	288	
	41	BLK			285	
	43	WHT	22	9	287	
	42	BLK			286	
	36	WHT	22	9	280	
	35	BLK			279	
	37	WHT	22	9	281	
	34	BLK			278	
	38	WHT	22	9	282	
	33	BLK			277	
	32	WHT	22	9	276	
	25	BLK			269	
	40	WHT	22	9	284	
	31	BLK			275	
	30	WHT	22	9	274	
	27	BLK			271	
	29	WHT	22	9	273	
	28	BLK			272	
	22	WHT	22	9	266	
	21	BLK			265	
	23	WHT	22	9	267	
	20	BLK			264	
	24	WHT	22	9	268	
	19	BLK			263	
	18	WHT	22	9	262	
	11	BLK			255	
	26	WHT	22	9	270	
	17	BLK			261	
	16	WHT	22	9	260	
	13	BLK			257	
	15	WHT	22	9	259	
	14	BLK			258	
*	113	SHLD				
	2	WHT	22	8	246	
	12	WHT	22	8	256	
	10	WHT	22	8	254	
	9	WHT	22	9	253	
	6	BLK			250	
	8	WHT	22	8	252	
	4	BLK	22	7	248	

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN P.S. [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

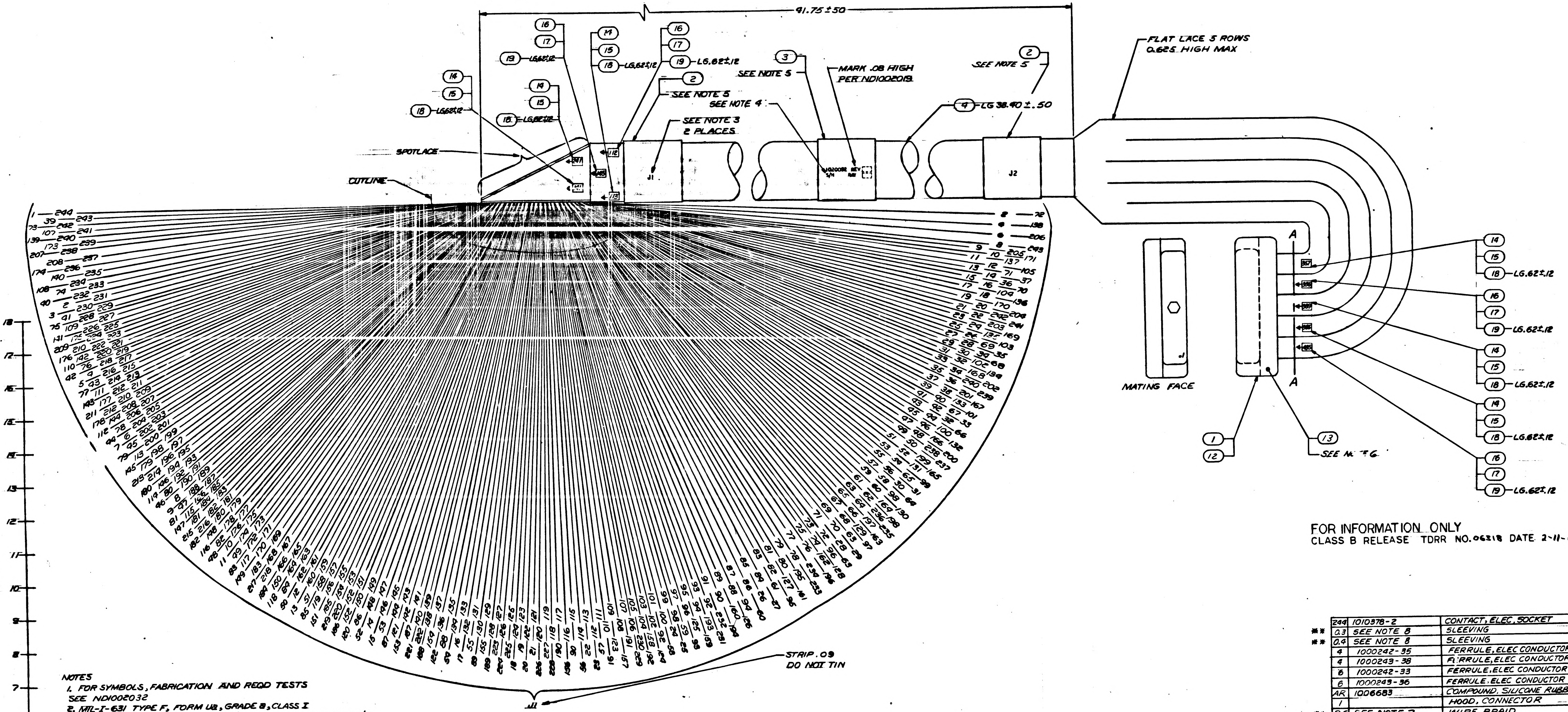
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO 49956 | SIZE J | NASA DRAWING NO 1020092
SCALE NONE | WT | SHEET 4 OF 4

1020092 F

1020092 F

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR06318	2-4-64	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-11-64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U2, GRADE 8, CLASS I CATEGORY I FOR FIND NO. 4 AWG 13/4, FOR FIND NO. 5 AWG 3/4, FOR FIND NO. 6 AWG 5/8.
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND FIND NOS. 2 & 3 USING TETROHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO.13 PER ND1002083
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 11 BRAID SIZE 21/32, AWG 30
8. MIL-I-23053 CLASS I, BLACK FOR FIND NO. 18 SIZE 1/2, FOR FIND NO. 19 SIZE 7/8
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

—	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010378-2	CONTACT, ELEC, SOCKET	20
**	0.3	SEE NOTE 8	SLEEVING	19
**	0.4	SEE NOTE 8	SLEEVING	18
	4	1000242-35	FERRULE, ELEC CONDUCTOR	17
	4	1000243-38	FERRULE, ELEC CONDUCTOR	16
	6	1000242-33	FERRULE, ELEC CONDUCTOR	15
	6	1000243-36	FERRULE, ELEC CONDUCTOR	14
	AR	1006683	COMPOUND, SILICONE RUBBER	13
	1		HOOD, CONNECTOR	12
**	9.6	SEE NOTE 7	WIRE, BRAID	11
**	14.4	SEE NOTE 7	WIRE, BRAID	10
**	610	1019391-11	WIRE, ELEC	9
**	72	MIL-W-16878/4 E22, WHT	WIRE, ELEC	8
**	11	MIL-W-16878/4 E22, BLK	WIRE, ELEC	7
**	14.4	SEE NOTE 2	SLEEVING	6
**	9.6	SEE NOTE 2	SLEEVING	5
**	3.2	SEE NOTE 2	SLEEVING	4
	1	1019472-11	BAND MARKER, CABLE	3
	2	1019472-11A	BAND MARKER, CABLE	2
	1	1010692-244	CONNECTOR	1

LIST OF MATERIALS

** DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Matty DATE 26 NOV 63
CHECKED A. Cassi 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL TEST MOUNT AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020092
SCALE 1/1
WT
SHEET 1 OF 3

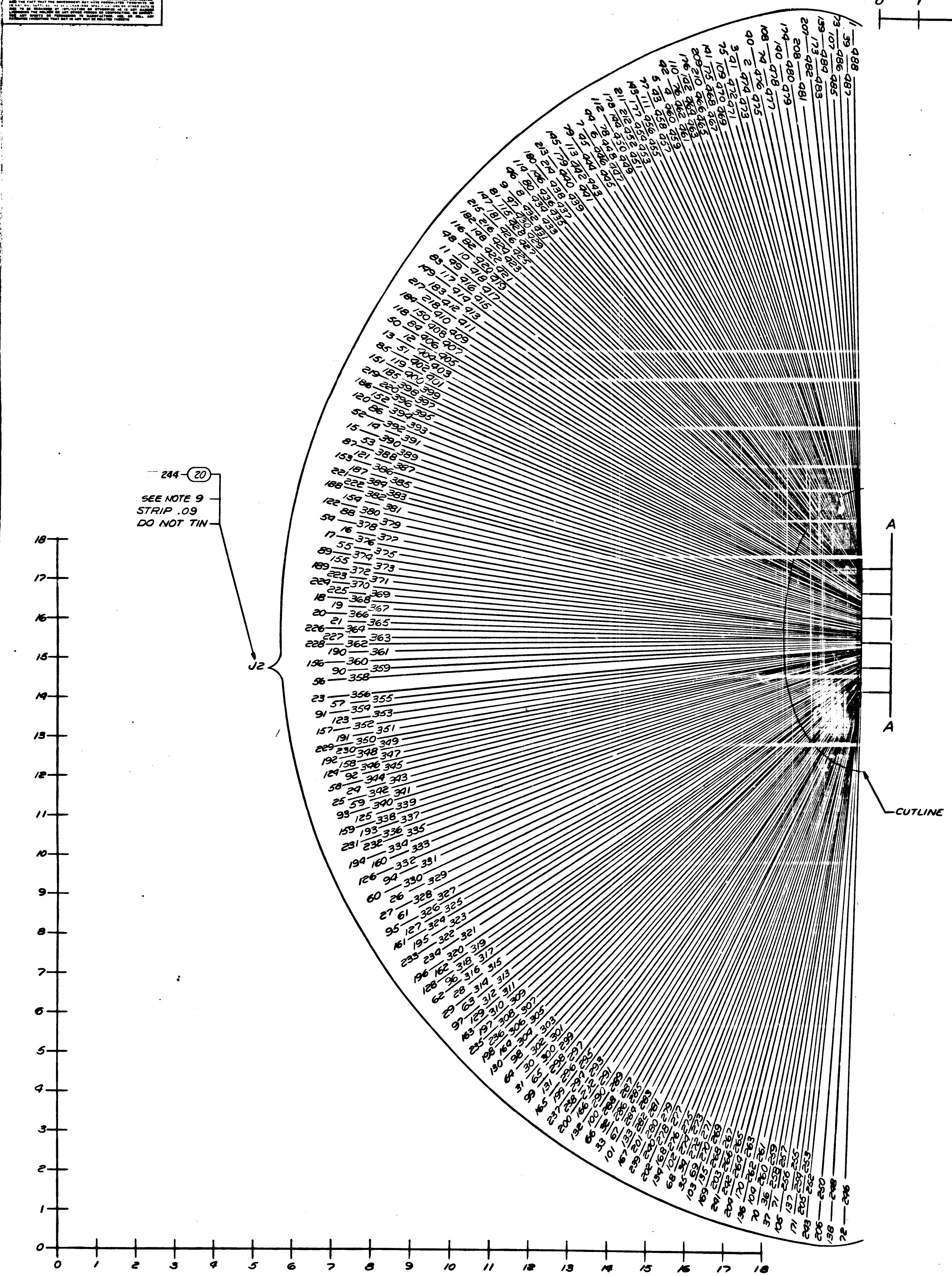
1020092

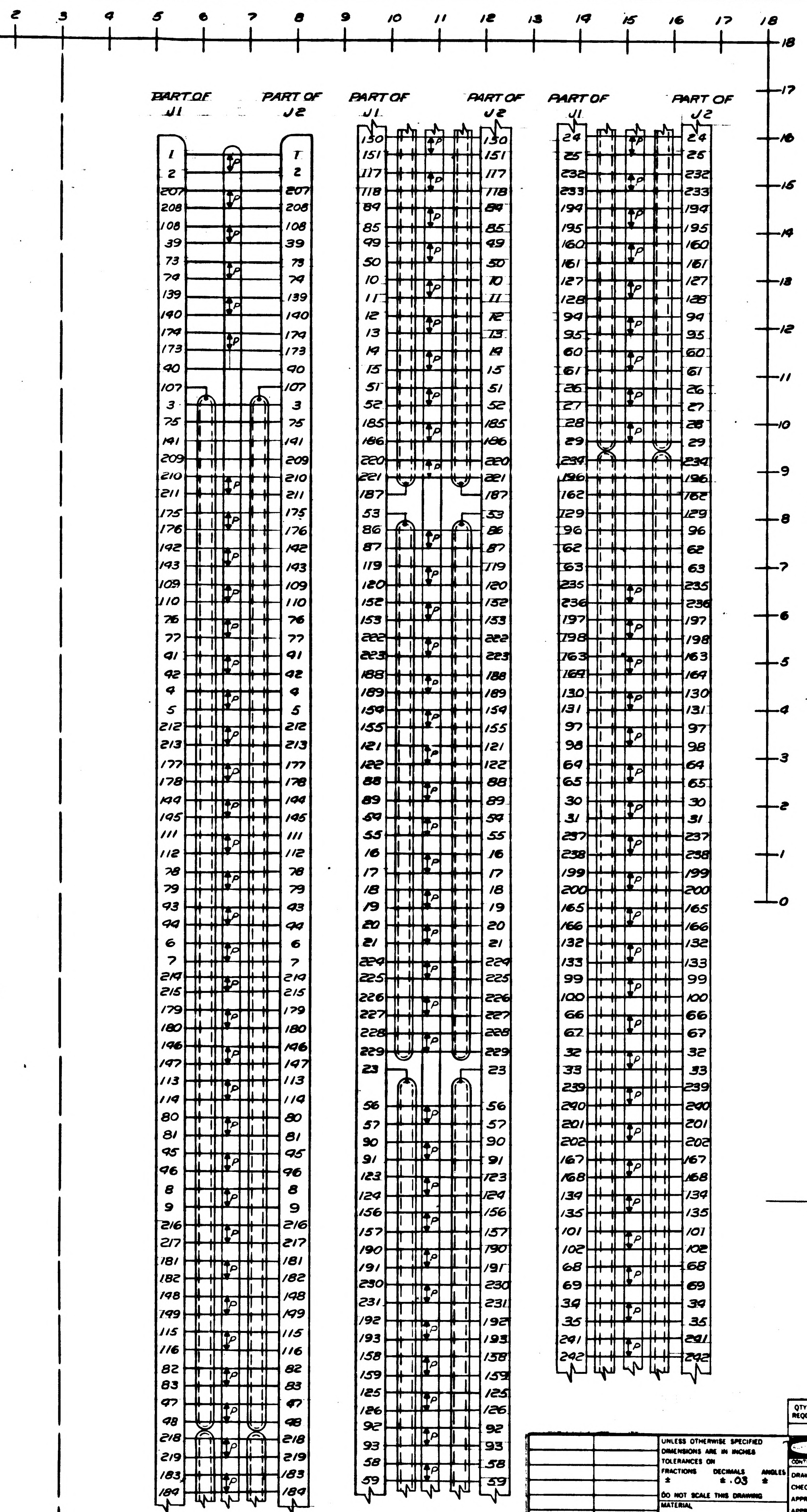
1020092

INCHES
PHOTOGRAPHIC SCALE ONLY

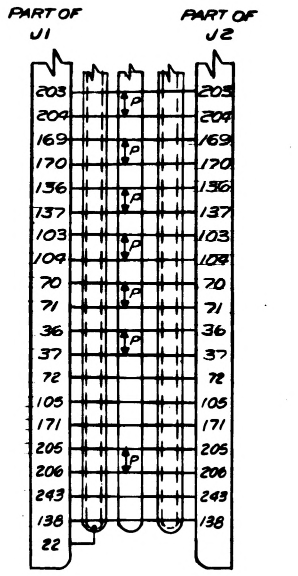
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06318	2-11-64	


244 — 20
SEE NOTE 9
STRIP .09
DO NOT TIN
J2
A
A
CUTLINE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
PART OF J1
PART OF J2
P
1 2 207 208 108 39 73 74 139 140 174 173 40 107 3 75 141 209 210 211 175 176 192 193 109 110 76 77 91 92 4 5 212 213 177 178 194 195 111 112 78 79 43 44 6 7 214 215 179 180 196 147 113 114 80 81 95 96 8 9 216 217 181 182 148 149 115 116 82 83 47 48 218 219 183 184
150 151 117 118 84 85 49 50 10 11 12 13 14 15 51 52 185 186 220 221 187 53 86 87 119 120 152 153 222 223 188 189 154 155 121 122 88 89 54 55 16 17 18 19 20 21 224 225 226 227 228 229 23 56 57 90 91 123 124 156 157 190 191 230 231 192 193 158 159 125 126 92 93 58 59
24 25 232 233 194 195 160 161 127 128 94 95 60 61 26 27 28 29 234 196 162 129 96 62 63 235 236 197 198 163 164 130 131 97 98 64 65 30 31 237 238 199 200 165 166 132 133 99 100 66 67 32 33 239 240 201 202 167 168 134 135 101 102 68 69 34 35 241 242

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-11-64


PART OF J1
PART OF J2
P
203 204 169 170 136 137 103 104 70 71 36 37 72 105 171 205 206 243 138 22

ELECTRICAL SCHEMATIC

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1020091	1020010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN Z. Matty DATE 26 Nov 63
CHECKED A. Cormack
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL 2-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020092
SCALE 1/1 WT SHEET 2 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1050035

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR 06318	2-11-64	

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	244	WHT	22	9	488	
	231	BLK			475	
	238	WHT	22	9	482	
	237	BLK			481	
	234	WHT	22	9	478	
	243	BLK			487	
	242	WHT	22	9	486	
	233	BLK			477	
	240	WHT	22	9	484	
	235	BLK			479	
	236	WHT	22	9	480	
	239	BLK			483	
	232	WHT	22	8	476	
	230	WHT	22	8	474	ATTACH FIND NO. 5 AND 11. LG 57.6 ±.5
	228	WHT	22	8	472	
	226	WHT	22	8	470	
	224	WHT	22	8	468	
	223	WHT	22	9	467	
	210	BLK			454	
	225	WHT	22	9	469	
	222	BLK			466	
	221	WHT	22	9	465	
	212	BLK			456	
	227	WHT	22	9	471	
	220	BLK			464	
	219	WHT	22	9	463	
	214	BLK			458	
	229	WHT	22	9	473	
	218	BLK			462	
	217	WHT	22	9	461	
	216	BLK			460	
	209	WHT	22	9	453	
	196	BLK			440	
	211	WHT	22	9	455	
	208	BLK			452	
	207	WHT	22	9	451	
	198	BLK			442	
	213	WHT	22	9	457	
	206	BLK			450	
	205	WHT	22	9	449	
	200	BLK			444	
	215	WHT	22	9	459	
	204	BLK			448	
	203	WHT	22	9	447	
	202	BLK			446	
	195	WHT	22	9	439	
	182	BLK			426	
	197	WHT	22	9	441	
	194	BLK			438	
	193	WHT	22	9	437	
	184	BLK			428	
	199	WHT	22	9	443	
	192	BLK			436	
	191	WHT	22	9	435	
	186	BLK			430	
	201	WHT	22	9	445	
	190	BLK			434	
	189	WHT	22	9	433	
	188	BLK			432	
	181	WHT	22	9	425	
	168	BLK			412	
	183	WHT	22	9	427	
	180	BLK			424	
	179	WHT	22	9	423	
	170	BLK			414	
	185	WHT	22	9	429	
	178	BLK			422	
	177	WHT	22	9	421	
	172	BLK			416	
	187	WHT	22	9	431	
	176	BLK			420	
*	241	SHIELD			485	*
	167	WHT	22	9	411	ATTACH FIND NO. 6 AND 10. LG 526 ±.5
	154	BLK			398	
	169	WHT	22	9	413	
	166	BLK			410	
	165	WHT	22	9	409	
	156	BLK			400	
	171	WHT	22	9	415	
	164	BLK			408	
	163	WHT	22	9	407	
	158	BLK			402	
	173	WHT	22	9	417	
	162	BLK			406	

* ATTACH FIND NO. 7 LG 4.0 ±.12

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	175	WHT	22	9	419	
	174	BLK			418	
	161	WHT	22	9	405	
	160	BLK			404	
	147	WHT	22	9	391	
	146	BLK			390	
	159	WHT	22	9	403	
	148	BLK			392	
	155	WHT	22	9	399	
	152	BLK			396	
	153	WHT	22	9	397	
	140	BLK			384	
*	141	SHIELD			385	*
	149	WHT	22	9	393	ATTACH FIND NO.6 AND 10. LG 57.6 ±.5
	144	BLK			388	
	157	WHT	22	9	401	
	150	BLK			394	
	151	WHT	22	9	395	
	142	BLK			386	
	139	WHT	22	9	383	
	127	BLK			371	
	138	WHT	22	9	382	
	128	BLK			372	
	137	WHT	22	9	381	
	129	BLK			373	
	143	WHT	22	9	387	
	136	BLK			380	
	135	WHT	22	9	379	
	130	BLK			374	
	134	WHT	22	9	378	
	131	BLK			375	
	133	WHT	22	9	377	
	132	BLK			376	
	124	WHT	22	9	368	
	123	BLK			367	
	122	WHT	22	9	366	
	121	BLK			365	
	126	WHT	22	9	370	
	125	BLK			369	
	120	WHT	22	9	364	
	119	BLK			363	
	118	WHT	22	9	362	
	106	BLK			350	
*	145	SHIELD			389	*
	114	WHT	22	9	358	ATTACH FIND NO.5 AND 11 LG 57.6 ±.5
	111	BLK			355	
	115	WHT	22	9	359	
	110	BLK			354	
	109	WHT	22	9	353	
	102	BLK			346	
	116	WHT	22	9	360	
	108	BLK			352	
	117	WHT	22	9	361	
	107	BLK			351	
	105	WHT	22	9	349	
	92	BLK			336	
	104	WHT	22	9	348	
	93	BLK			337	
	103	WHT	22	9	347	
	94	BLK			338	
	95	WHT	22	9	339	
	88	BLK			332	
	101	WHT	22	9	345	
	96	BLK			340	
	100	WHT	22	9	344	
	97	BLK			341	
	99	WHT	22	9	343	
	98	BLK			342	
	91	WHT	22	9	335	
	78	BLK			322	
	90	WHT	22	9	334	
	79	BLK			323	
	89	WHT	22	9	333	
	80	BLK			324	
	81	WHT	22	9	325	
	74	BLK			318	
	87	WHT	22	9	331	
	82	BLK			326	
	86	WHT	22	9	330	
	83	BLK			327	
	85	WHT	22	9	329	
	84	BLK			328	
	71	WHT	22	9	315	
	70	BLK			314	
*	112	SHIELD			356	*

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	77	WHT	22	8	321	ATTACH FIND NO.6 AND 10 LG 57.6 ±.5
	76				320	
	75				319	
	67				311	
	73				317	
	72				316	
	69	WHT	22	8	313	
	64	WHT	22	9	308	
	63	BLK			307	
	65	WHT	22	9	309	
	62	BLK			306	
	66	WHT	22	9	310	
	61	BLK			305	
	60	WHT	22	9	304	
	53	BLK			297	
	68	WHT	22	9	312	
	59	BLK			303	
	58	WHT	22	9	302	
	55	BLK			299	
	57	WHT	22	9	301	
	56	BLK			300	
	50	WHT	22	9	294	
	49	BLK			293	
	51	WHT	22	9	295	
	48	BLK			292	
	52	WHT	22	9	296	
	47	BLK			291	
	46	WHT	22	9	290	
	39	BLK			283	
	54	WHT	22	9	298	
	45	BLK			289	
	44	WHT	22	9	288	
	41	BLK			285	
	43	WHT	22	9	287	
	42	BLK			286	
	36	WHT	22	9	280	
	35	BLK			279	
	37	WHT	22	9	281	
	34	BLK			278	
	38	WHT	22	9	282	
	33	BLK			277	
	32	WHT	22	9	276	
	25	BLK			269	
	40	WHT	22	9	284	
	31	BLK			275	
	30	WHT	22	9	274	
	27	BLK			271	
	29	WHT	22	9	273	
	28	BLK			272	
	22	WHT	22	9	266	
	21	BLK			265	
	23	WHT	22	9	267	
	20	BLK			264	
	24	WHT	22	9	268	
	19	BLK			263	
	18	WHT	22	9	262	
	11	BLK			255	
	26	WHT	22	9	270	
	17	BLK			261	
	16	WHT	22	9	260	
	13	BLK			257	
	15	WHT	22	9	259	
	14	BLK			258	
*	113	SHLD				
	2	WHT	22	8	246	
	12	WHT	22	8	256	
	10	WHT	22	8	254	
	9	WHT	22	9	253	
	6	BLK			250	
	8	WHT	22	8	252	
	4	BLK	22	7	248	

FOR INFORMATION ONLY
CLASS B RELEASE — TDRR NO. 06318 DATE 11Feb64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

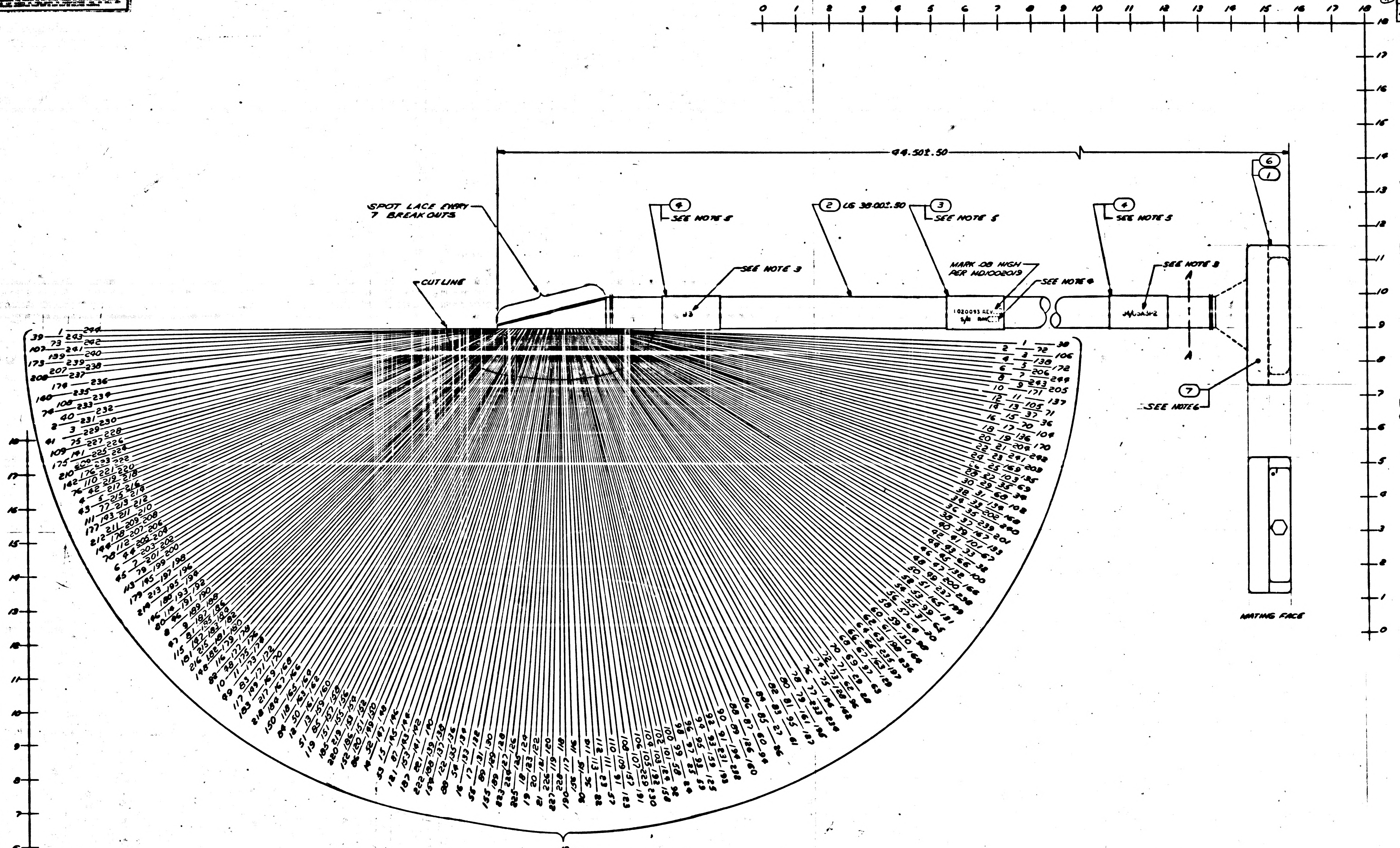
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN P.S. Tracy DATE 20 Jan 64
CHECKED A. Cazzaniga 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020092
SCALE NONE WT SHEET 3 OF 3

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 00036		
A	CHANGED PER TDRR 08123 DR. W. Oa CHK. J.C.G. APPD	12 MAY 66	KCB


44.50±.50
SPOT LACE EVERY 7 BREAKOUTS
CUT LINE
4
SEE NOTE 5
SEE NOTE 3
2 LG 38.00±.50
3
SEE NOTE 5
MARK .08 HIGH PER ND1002019
SEE NOTE 4
1020093 REV
4
SEE NOTE 5
SEE NOTE 3
6
1
A
A
7
SEE NOTE 6
MATING FACE
J3
STRIP .09 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 00036 DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631, TYPE F, FORM Ua, GRADE A, CLASS I, CATEGORY I FOR FIND NO. 2 AWG 1
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO. 7 PER ND1002083.
7. NUMBER PRECEEDING BALLOON DENOTES QUANTITY

A	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-2	CONTACT, ELEC. SOCKET	8
	AR	1006683	COMPOUND SILCONE RUBBER	7
	1	1006232-2	SHELL, POTTING, ELEC CONN 90°	6
*	[illegible]	MIL-W-16878/4 E22, WHT	WIRE, ELECTRICAL	5
	2	1014972-8A	BAND MARKER, CABLE	4
	1	1014972-8	BAND MARKER, CABLE	3
*	3.5	SEE NOTE 2	SLEEVING	2
	1	1010692-2	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

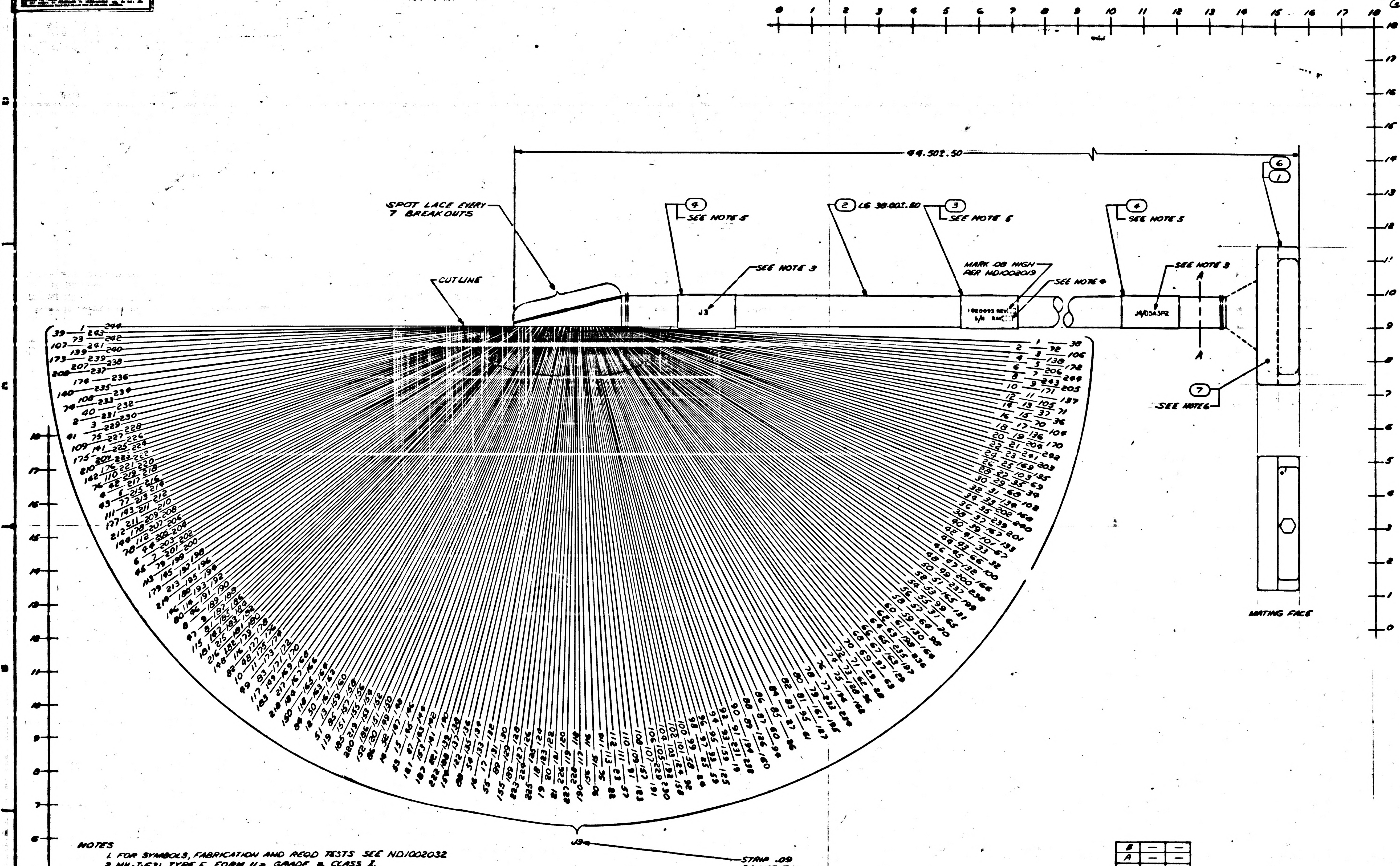
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9 494
DRAWN P.D. Glen DATE
CHECKED
APPROVAL C. Spalding
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020093
SCALE 1/1
SHEET 1 OF 3

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 06036	-	-
A	CHANGED PER TDRR 08123 DR. W. Owen CHK. G.C.G. APPD	12 May 64	KEB
B	CHANGED PER TDRR 10452 DR. CHKD. G. C APPD	24 Jun 64	KEB



44.50±.50
SPOT LACE EVERY 7 BREAKOUTS
CUTLINE
4 SEE NOTE 5
SEE NOTE 3
J3
2 L6 38.00±.50
3 SEE NOTE 6
MARK .08 HIGH PER ND1002019
1020093 REV. S/N
SEE NOTE 4
4 SEE NOTE 5
SEE NOTE 3
J4/D5A3P2
A
A
6
1
7
SEE NOTE 6
MATING FACE
J3
STRIP .09 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631, TYPE F, FORM U2, GRADE A, CLASS I, CATEGORY I FOR FIND NO. 2 AWG 1
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO. 7 PER ND1002009, METHOD E
7. NUMBER PRECEDING BALLOON DENOTES QUANTITY

B	—	—
A	—	—
—	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
244	1010738-2	CONTACT, ELEC. SOCKET	8
AR	1006683	COMPOUND SILICONE RUBBER	7
1	1006232-2	SHELL, POTTING, ELEC CONN	6
* 886	MIL-W-16878/4 E22 WHT	WIRE, ELECTRICAL	5
2	1014972-3A	BAND MARKER, CABLE	4
1	1014472-8	BAND MARKER, CABLE	3
* 8.5	SEE NOTE 2	SLEEVING	2
1	1010692-2	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

1020091	1020010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. Olson DATE
CHECKED
APPROVAL C
APPROVAL
APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

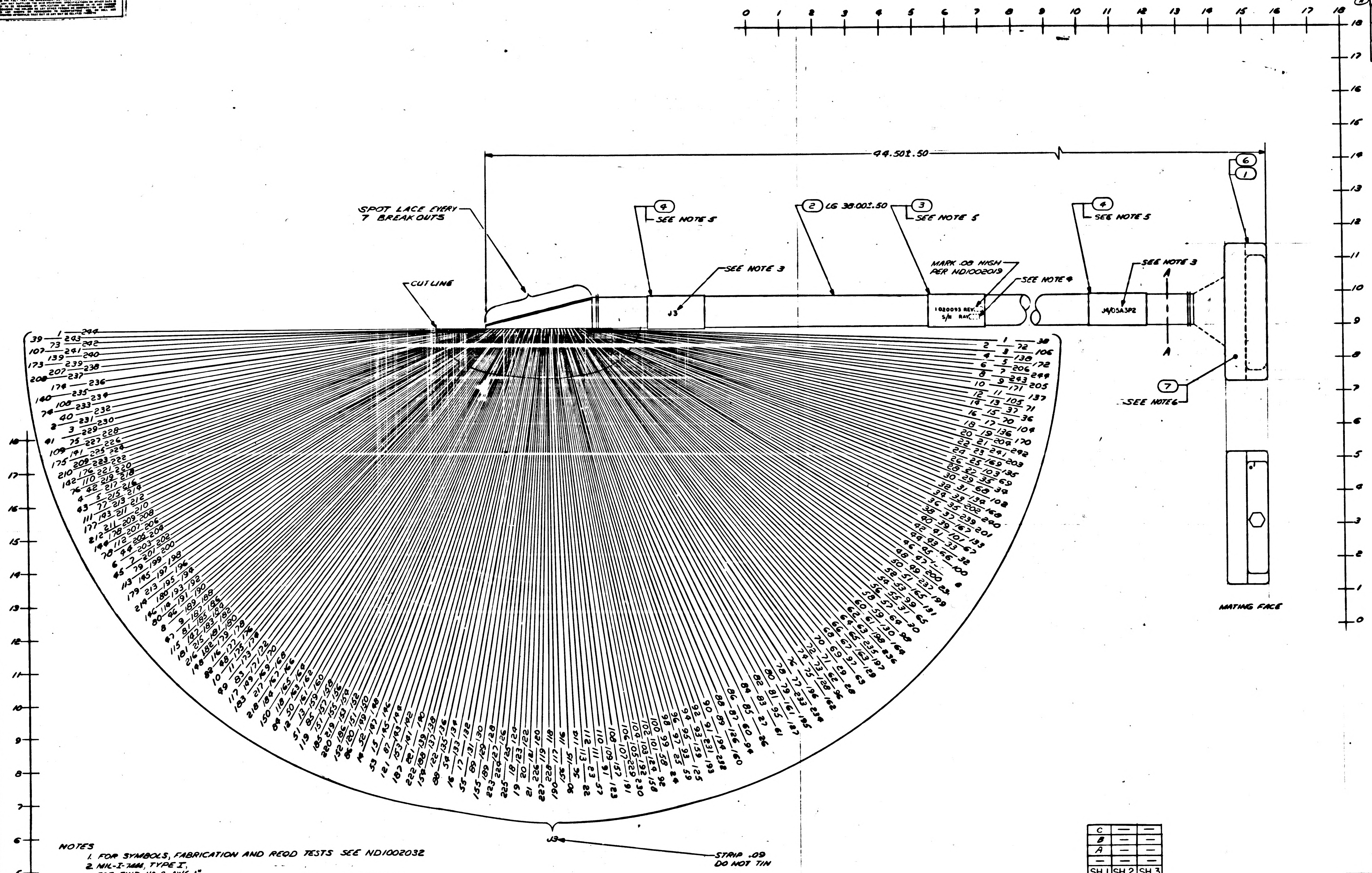
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020093
SCALE 1/1
SHEET 1 OF 3

1020093

1020093

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 06036	-	-
A	CHANGED PER TDRR 08123 DR. W. Owen CHK. J.C.J. APPD.	12 MAY 64	KEB
B	CHANGED PER TDRR 10452 DR. Ken Beal CHK. G. C APPD.	24 June 64	KEB
C	CHANGED PER TDRR 10984 DR. CHK J.C.J APPD.	23 June 64	TB



44.50±.50
SPOT LACE EVERY 7 BREAKOUTS
CUTLINE
④ SEE NOTE 5
SEE NOTE 3
J3
② LG 38.00±.50
③ SEE NOTE 5
MARK .08 HIGH PER ND1002019
SEE NOTE 4
1020093 REV. S/N
④ SEE NOTE 5
SEE NOTE 3
J4/05A3P2
A
A
⑥
①
⑦
SEE NOTE 6
MATING FACE
J3
STRIP .09 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 4/1/64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-7444, TYPE I,
FOR FIND NO. 2 AWG 1"
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH
10 % POLYVINYL CHLORIDE
6. FILL WITH FIND NO. 7 PER ND1002009, METHOD E
7. NUMBER PRECEDING BALLOON DENOTES QUANTITY

	SH 1	SH 2	SH 3
C	—	—	—
B	—	—	—
A	—	—	—
—	—	—	—

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-2	CONTACT, ELEC, SOCKET	8
	AR	1006683	COMPOUND SILCONE RUBBER	7
	1	1006232-2	SHELL, POTTING, ELEC CONN 90°.	6
*	886	MIL-W-16878/4 E22 WHT	WIRE, ELECTRICAL	5
	2	1019472-8A	BAND MARKER, CABLE	4
	1	1019472-8	BAND MARKER, CABLE	3
*	3.5	SEE NOTE 2	SLEEVING	2
	1	1010642-2	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9 497
DRAWN R.D. Glenn DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

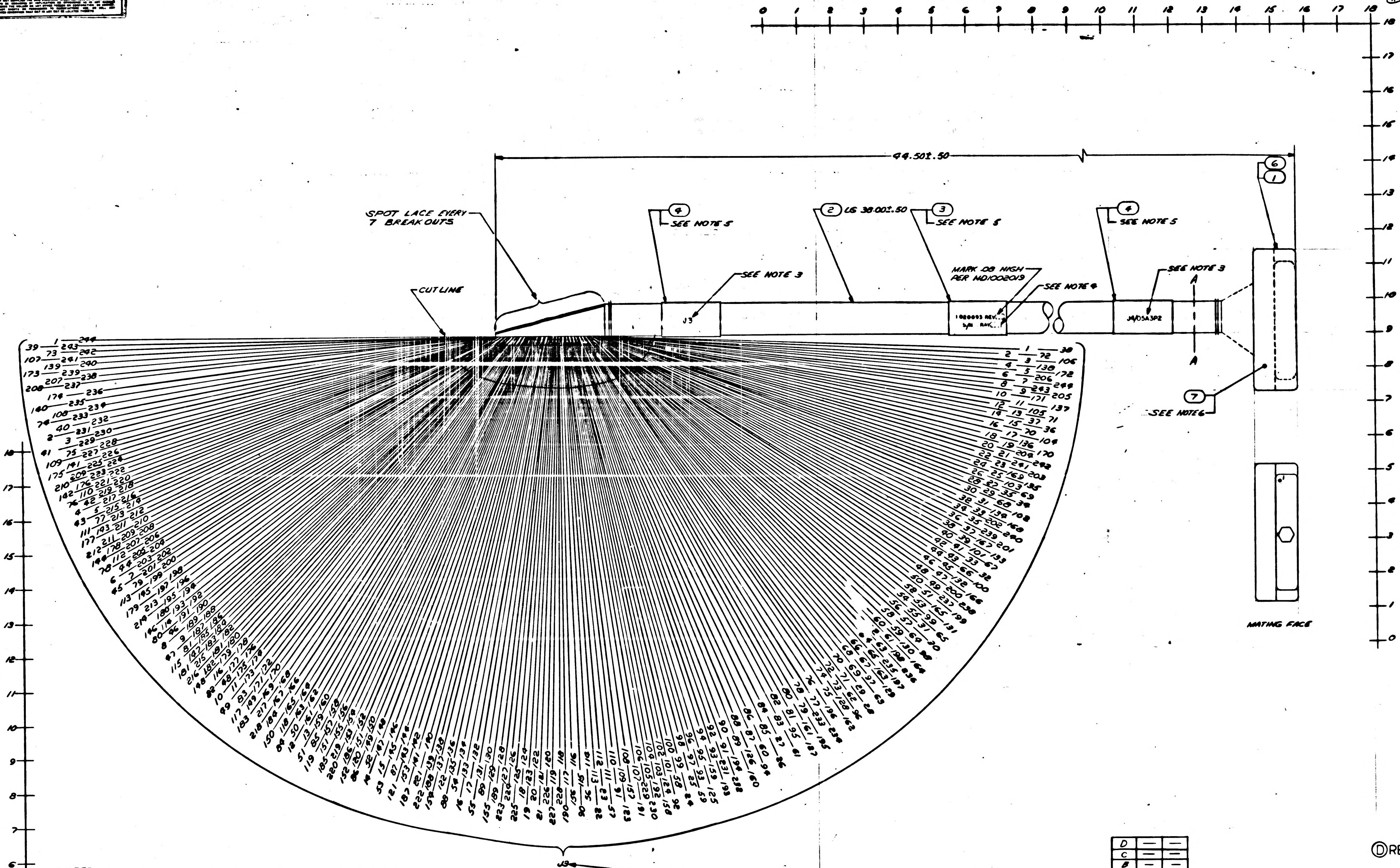
CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020093
SCALE 1/1 WT SHEET 1 OF 3

1020093

1050093

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 06036		
A	CHANGED PER TDRR 08123 DR. W Dunn CHK. J.C.G APPD. R Conley	12 MAY 64	KEB
B	CHANGED PER TDRR 10452 DR. Ken Budd CHKG G. C APPD. J. Conley	24 Jul 64	KEB
C	CHANGED PER TDRR 10984 DR. [illegible] CHK J.C.J APPD. R Conley	3 Dec 64	TB
D	REPLACED WITH CHANGE BY REV E PER TDRR 15999 DR. J.P. Leonard CHK [illegible] APPD. J. Marino	3 Mar 65	KEB


44.50±.50
SPOT LACE EVERY 7 BREAKOUTS
CUTLINE
4 SEE NOTE 5
SEE NOTE 3
J3
2 LG 38.00±.50
3 SEE NOTE 5
MARK .08 HIGH PER ND1002019
SEE NOTE 4
1020093 REV
4 SEE NOTE 5
SEE NOTE 3
J4/05A3P2
A
A
6
1
7
SEE NOTE 6
MATING FACE
J3
STRIP .09 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 4/14/64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-7444, TYPE I,
FOR FIND NO. 2 AWG 1"
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH
10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO. 7 PER ND1002009, METHOD E
7. NUMBER PRECEDING BALLOON DENOTES QUANTITY

Ⓓ REPLACED WITH CHANGE BY REV E

D	—	—	
C	—	—	
B	—	—	
A	—	—	
—	—	—	
SH 1	SH 2	SH 3	
REV STATUS OF SHEETS			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
244	1010738-2	CONTACT, ELEC, SOCKET	8
AR	1006683	COMPOUND SILCONE RUBBER	7
1	1006232-2	SHELL, POTTING, ELEC CONN 90°.	6
* 886	MIL-W-16878/4 E22 WHT	WIRE, ELECTRICAL	5
2	1014472-8A	BAND MARKER, CABLE	4
1	1014472-8	BAND MARKER, CABLE	3
* 3.5	SEE NOTE 2	SLEEVING	2
1	1010692-2	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9 498

DRAWN RD Glen DATE
CHECKED [illegible]
APPROVAL C. Spearing JAX
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 1.28.64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL,
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020093
SCALE 1/1 WT SHEET 1 OF

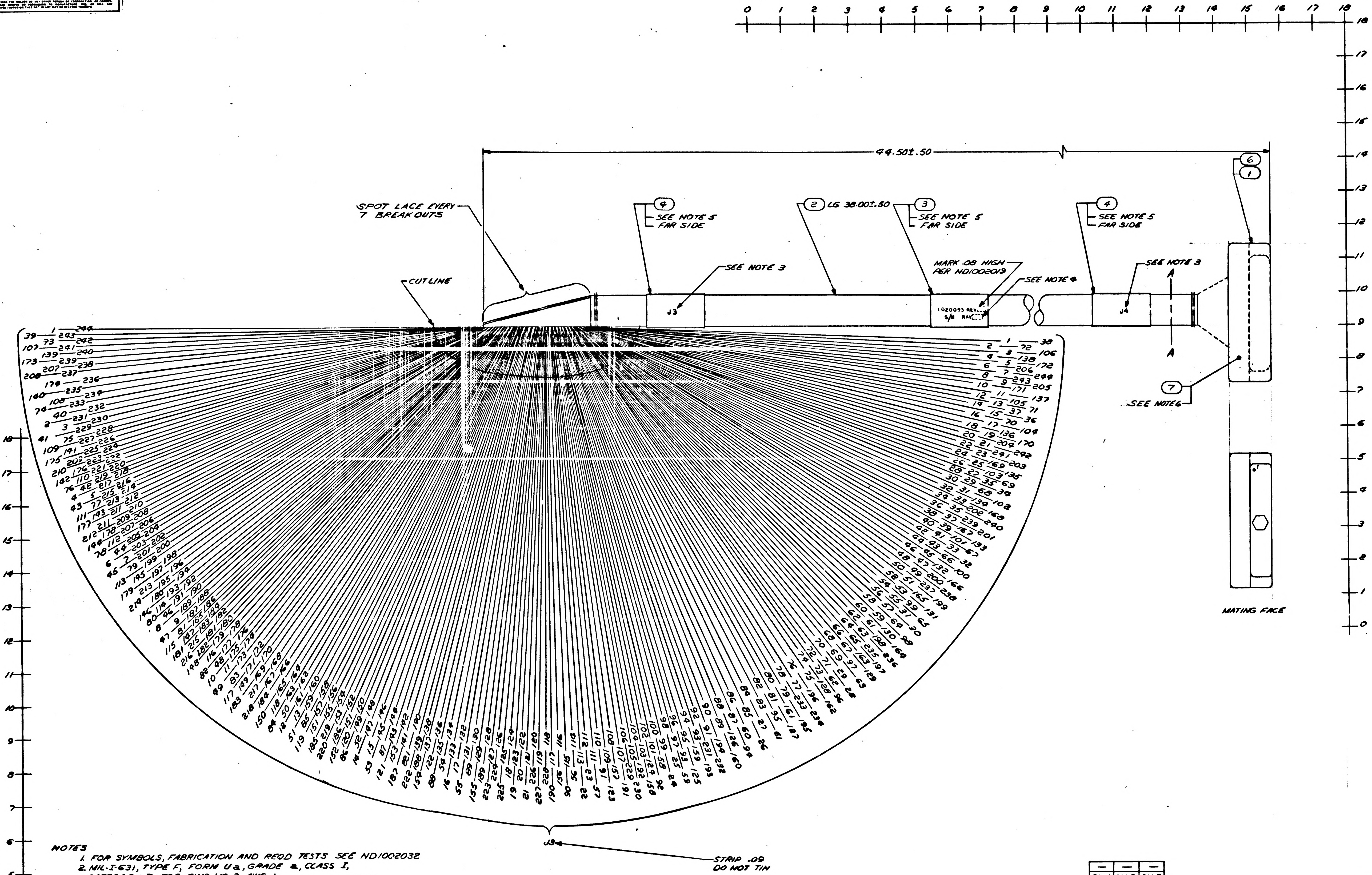
MASTER

1020093

1020093

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 06036		



44.50±.50
SPOT LACE EVERY 7 BREAKOUTS
CUTLINE
④ SEE NOTE 5 FAR SIDE
SEE NOTE 3
J3
② LG 38.00±.50
③ SEE NOTE 5 FAR SIDE
MARK .08 HIGH PER ND1002019
SEE NOTE 4
1020093 REV. S/N RAY
④ SEE NOTE 5 FAR SIDE
SEE NOTE 3
J4
A
A
⑥
①
⑦
SEE NOTE 6
MATING FACE
J3
STRIP .09 DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 4/1/64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631, TYPE F, FORM U a, GRADE a, CLASS I, CATEGORY I FOR FIND NO. 2 AWG 1
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND FIND NOS. 3 & 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. FILL WITH FIND NO. 7 PER ND1002083.
7. NUMBER PRECEEDING BALLOON DENOTES QUANTITY

-	-	-
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	244	1010738-2	CONTACT, ELEC, SOCKET	8
	AR	1006683	COMPOUND SILCONE RUBB	7
	1		HOOD, CONNECTOR	6
*	886	MIL-W-16878/4 E22, WHT	WIRE, ELECTRICAL	5
	2	1019972-5A	BAND MARKER, CABLE	4
	1	1019972-5	BAND MARKER, CABLE	3
*	3.5	SEE NOTE 2	SLEEVING	2
	1	1010692-1	CONNECTOR	1

LIST OF MATERIALS

* DENOTE LENGTH IN FEET

NEXT ASSY	USED ON
1020091	1020010

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9 498
DRAWN RD: Glenn DATE [illegible]
CHECKED [illegible]
APPROVAL C. Sporting [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 29 Jan 64
MIT APPROVAL [illegible] 1-28-64

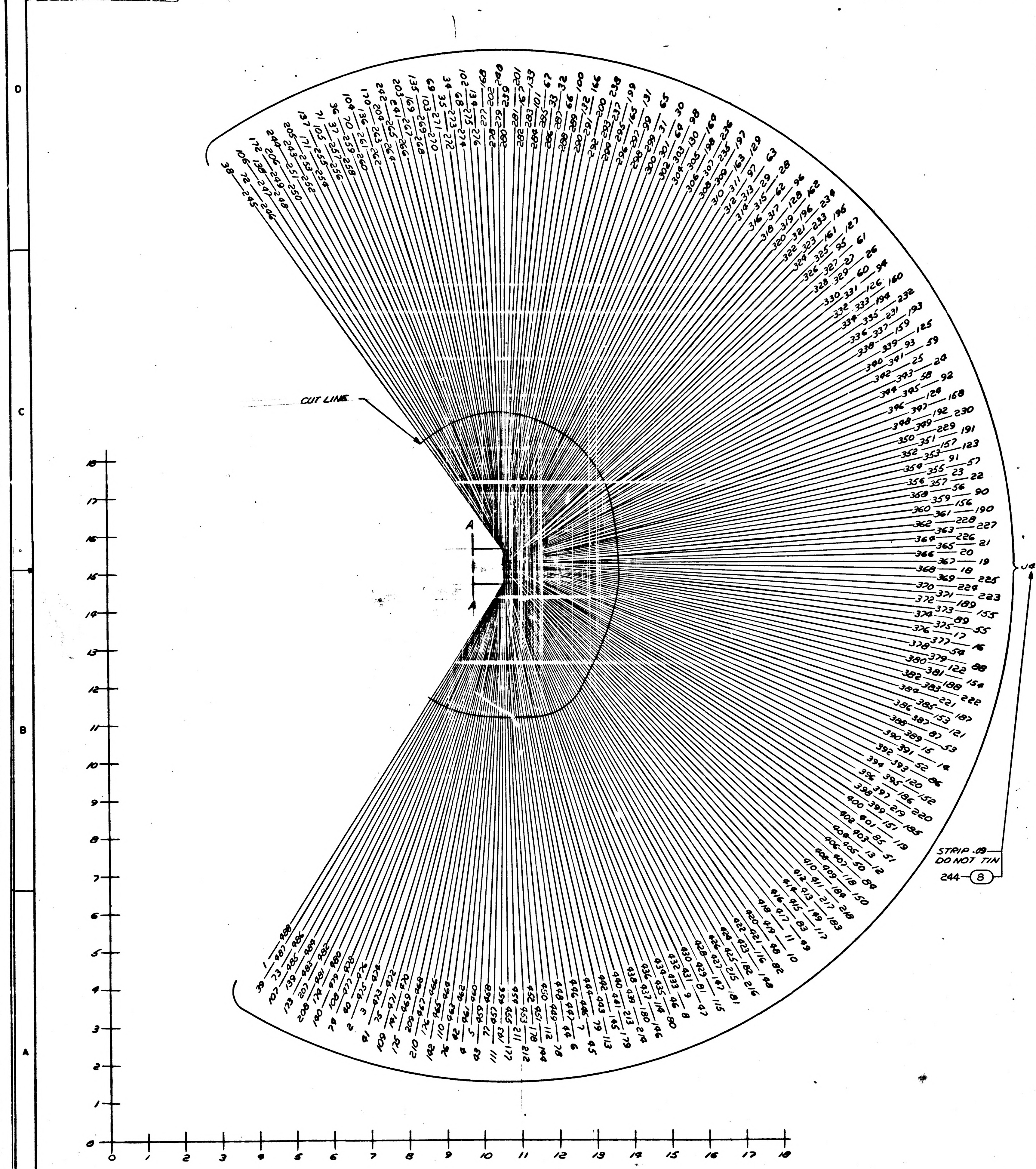
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

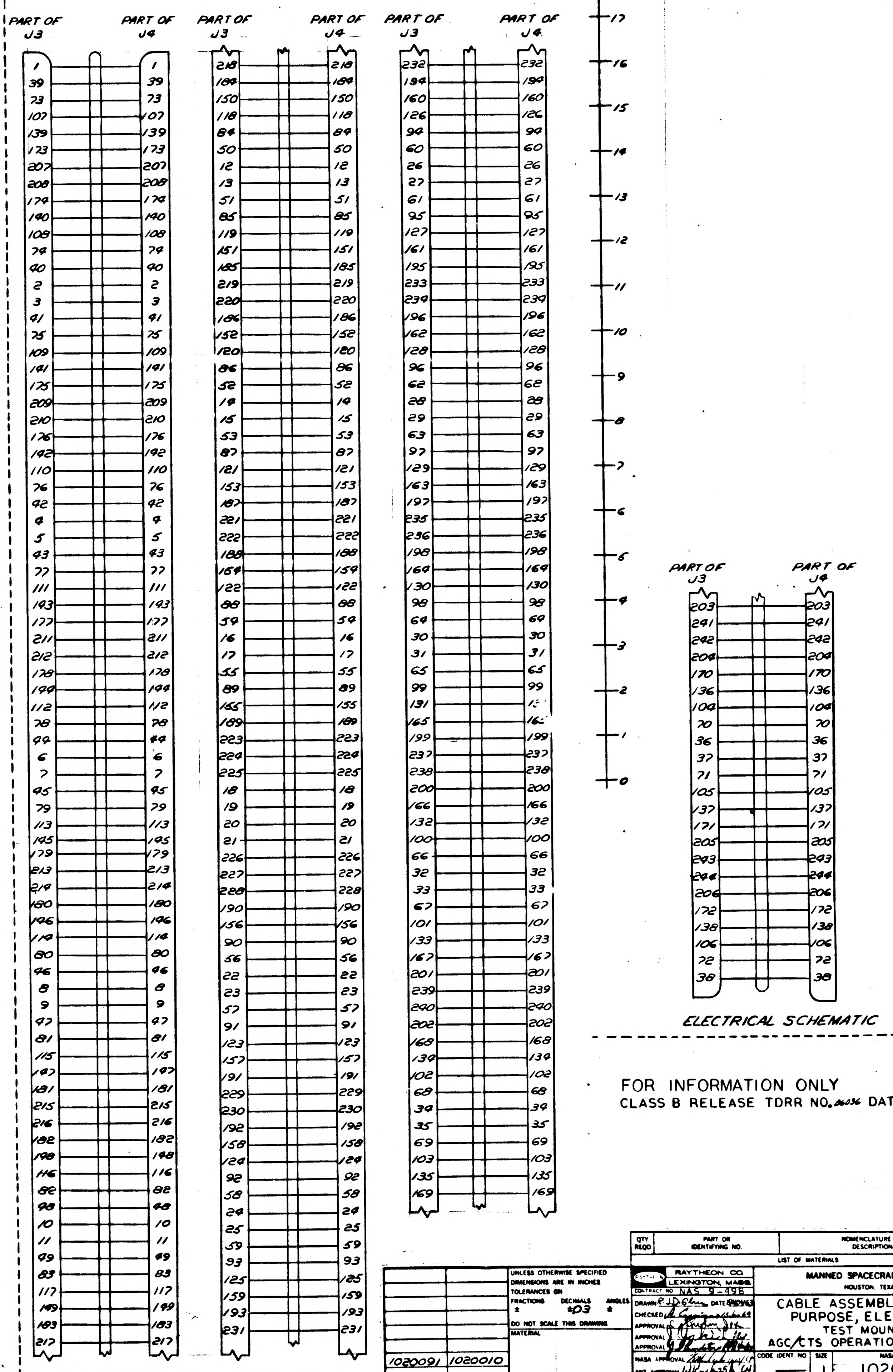
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL TEST MOUNT AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020093
SCALE 1/1
WT
SHEET 1 OF 3

1020093

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR 56036		





PART OF J3	PART OF J4
1	1
39	39
73	73
107	107
139	139
173	173
207	207
208	208
174	174
140	140
108	108
74	74
40	40
2	2
3	3
41	41
75	75
109	109
141	141
175	175
209	209
210	210
176	176
142	142
110	110
76	76
42	42
4	4
5	5
43	43
77	77
111	111
143	143
177	177
211	211
212	212
178	178
144	144
112	112
78	78
44	44
6	6
7	7
45	45
79	79
113	113
145	145
179	179
213	213
214	214
180	180
146	146
114	114
80	80
46	46
8	8
9	9
47	47
81	81
115	115
147	147
181	181
215	215
216	216
182	182
148	148
116	116
82	82
48	48
10	10
11	11
49	49
83	83
117	117
149	149
183	183
217	217

PART OF J3	PART OF J4
218	218
184	184
150	150
118	118
84	84
50	50
12	12
13	13
51	51
85	85
119	119
151	151
185	185
219	219
220	220
186	186
152	152
120	120
86	86
52	52
14	14
15	15
53	53
87	87
121	121
153	153
187	187
221	221
222	222
188	188
154	154
122	122
88	88
54	54
16	16
17	17
55	55
89	89
165	155
189	189
223	223
224	224
225	225
18	18
19	19
20	20
21	21
226	226
227	227
228	228
190	190
156	156
90	90
56	56
22	22
23	23
57	57
91	91
123	123
157	157
191	191
229	229
230	230
192	192
158	158
124	124
92	92
58	58
24	24
25	25
59	59
93	93
125	125
159	159
193	193
231	231

PART OF J3	PART OF J4
232	232
194	194
160	160
126	126
94	94
60	60
26	26
27	27
61	61
95	95
127	127
161	161
195	195
233	233
234	234
196	196
162	162
128	128
96	96
62	62
28	28
29	29
63	63
97	97
129	129
163	163
197	197
235	235
236	236
198	198
164	164
130	130
98	98
64	64
30	30
31	31
65	65
99	99
131	1[illegible]
165	16[illegible]
199	199
237	237
238	238
200	200
166	166
132	132
100	100
66	66
32	32
33	33
67	67
101	101
133	133
167	167
201	201
239	239
240	240
202	202
168	168
134	134
102	102
68	68
34	34
35	35
69	69
103	103
135	135
169	169

PART OF J3	PART OF J4
203	203
241	241
242	242
204	204
170	170
136	136
104	104
70	70
36	36
37	37
71	71
105	105
137	137
171	171
205	205
243	243
244	244
206	206
172	172
138	138
106	106
72	72
38	38

ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 56036 DATE [illegible]

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020091	1020010
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. J. D. Glen DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 1-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, SPECIAL
PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020093
SCALE 1/1 WT SHEET 2 OF 3

NOTICE — When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	244	WHT	22	5	488	
	243				487	
	242				486	
	241				485	
	240				484	
	239				483	
	238				482	
	237				481	
	236				480	
	235				479	
	234				478	
	233				477	
	232				476	
	231				475	
	230				474	
	229				473	
	228				472	
	227				471	
	226				470	
	225				469	
	224				468	
	223				467	
	222				466	
	221				465	
	220				464	
	219				463	
	218				462	
	217				461	
	216				460	
	215				459	
	214				458	
	213				457	
	212				456	
	211				455	
	210				454	
	209				453	
	208				452	
	207				451	
	206				450	
	205				449	
	204				448	
	203				447	
	202				446	
	201				445	
	200				444	
	199				443	
	198				442	
	197				441	
	196				440	
	195				439	
	194				438	
	193				437	
	192				436	
	191				435	
	190				434	
	189				433	
	188				432	
	187				431	
	186				430	
	185				429	
	184				428	
	183				427	
	182				426	
	181				425	
	180				424	
	179				423	
	178				422	
	177				421	
	176				420	
	175				419	
	174				418	
	173				417	
	172				416	
	171				415	
	170				414	
	169				413	
	168				412	
	167				411	
	166				410	
	165				409	
	164				408	
	163	WHT	22	5	407	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	162	WHT	22	5	406	
	161				405	
	160				404	
	159				403	
	158				402	
	157				401	
	156				400	
	155				399	
	154				398	
	153				397	
	152				396	
	151				395	
	150				394	
	149				393	
	148				392	
	147				391	
	146				390	
	145				389	
	144				388	
	143				387	
	142				386	
	141				385	
	140				384	
	139				383	
	138				382	
	137				381	
	136				380	
	135				379	
	134				378	
	133				377	
	132				376	
	131				375	
	130				374	
	129				373	
	128				372	
	127				371	
	126				370	
	125				369	
	124				368	
	123				367	
	122				366	
	121				365	
	120				364	
	119				363	
	118				362	
	117				361	
	116				360	
	115				359	
	114				358	
	113				357	
	112				356	
	111				355	
	110				354	
	109				353	
	108				352	
	107				351	
	106				350	
	105				349	
	104				348	
	103				347	
	102				346	
	101				345	
	100				344	
	99				343	
	98				342	
	97				341	
	96				340	
	95				339	
	94				338	
	93				337	
	92				336	
	91				335	
	90				334	
	89				333	
	88				332	
	87				331	
	86				330	
	85				329	
	84				328	
	83				327	
	82				326	
	81	WHT	22	5	325	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	80	WHT	22	5	324	
	79				323	
	78				322	
	77				321	
	76				320	
	75				319	
	74				318	
	73				317	
	72				316	
	71				315	
	70				314	
	69				313	
	68				312	
	67				311	
	66				310	
	65				309	
	64				308	
	63				307	
	62				306	
	61				305	
	60				304	
	59				303	
	58				302	
	57				301	
	56				300	
	55				299	
	54				298	
	53				297	
	52				296	
	51				295	
	50				294	
	49				293	
	48				292	
	47				291	
	46				290	
	45				289	
	44				288	
	43				287	
	42				286	
	41				285	
	40				284	
	39				283	
	38				282	
	37				281	
	36				280	
	35				279	
	34				278	
	33				277	
	32				276	
	31				275	
	30				274	
	29				273	
	28				272	
	27				271	
	26				270	
	25				269	
	24				268	
	23				267	
	22				266	
	21				265	
	20				264	
	19				263	
	18				262	
	17				261	
	16				260	
	15				259	
	14				258	
	13				257	
	12				256	
	11				255	
	10				254	
	9				253	
	8				252	
	7				251	
	6				250	
	5				249	
	4				248	
	3				247	
	2				246	
	1	WHT	22	5	245	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1020091	1020010
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

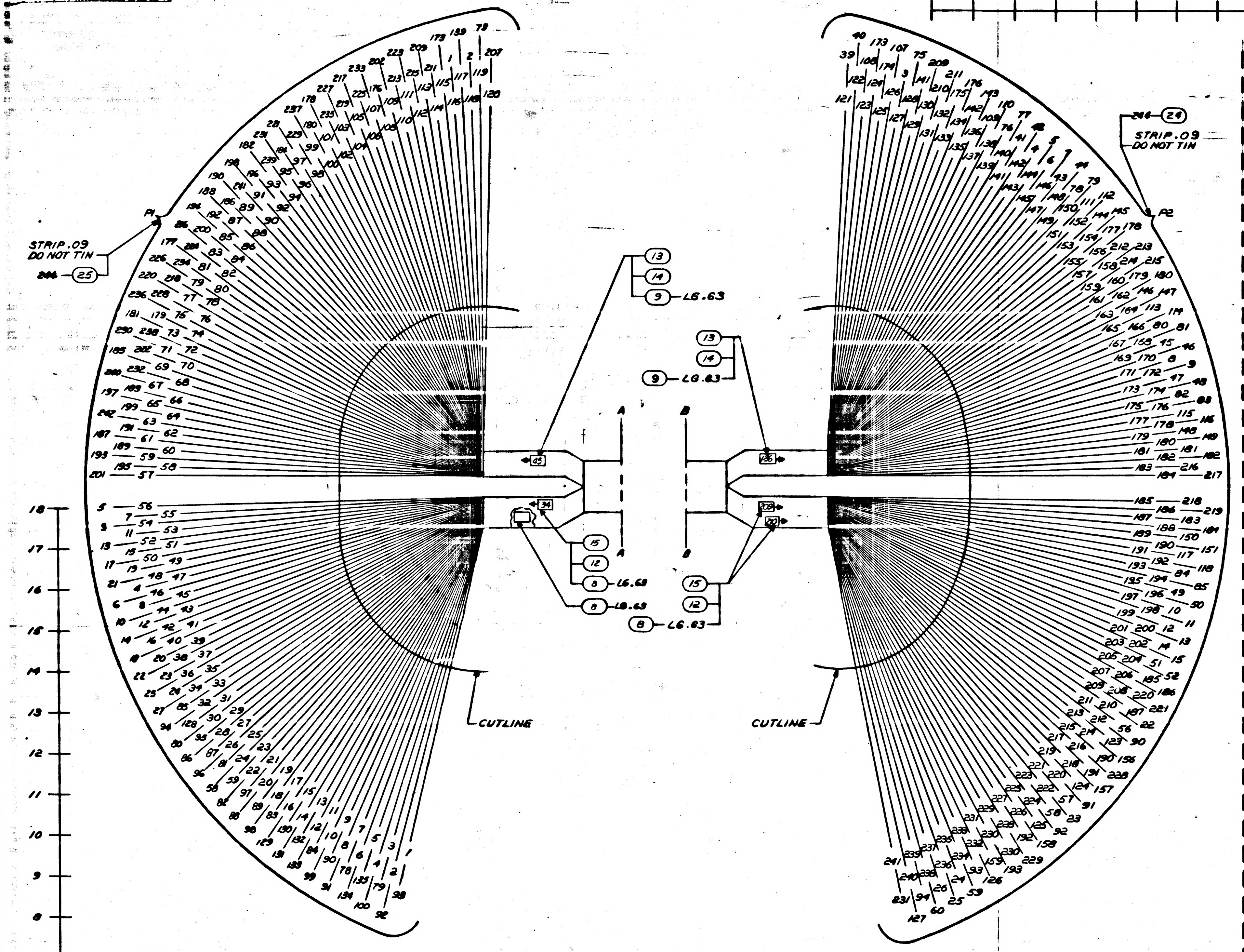
CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL
TEST MOUNT
AGC/CTS OPERATION CONSOLE

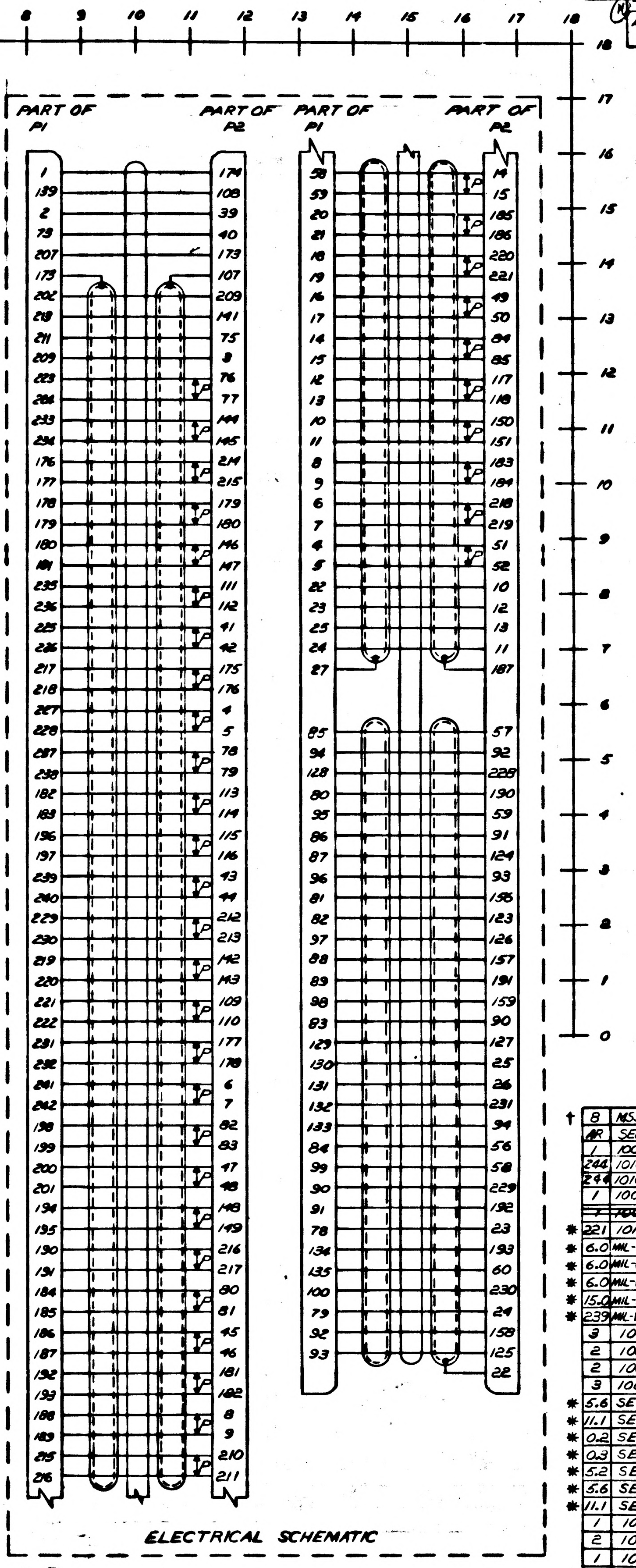
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020093
SCALE NONE
WT
SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	~~CL B~~ RELEASE PER TORR 06318		
A	CHANGED PEP TORR 08130 DR. CHK. G. Cappucci APPD.	20 MAY 64	HEB





FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO 06318 DATE 11/

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2 GRADE I CLASS I CATEGORY I FOR FIND NO. 5 AWG 7/16, FOR FIND NO. 6 AWG 5/8, FOR FIND NO. 7 AWG 1 1/4, FOR FIND NO. 27 AWG [illegible]
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 8 SIZE NO. 7/16 FOR FIND NO. 9 SIZE NO. 5/8
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 3/8 AWG 34 FOR FIND NO. 11 BRAID SIZE 9/16 AWG 30
8. ✱✱ DENOTES ATTACH FIND NO 7. LG 5.0
9. ~~DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 AND 2~~
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
11. REMOVE SCREWS FROM FIND NO. 23 AND FIND NO. 26 DISCARD AND REPLACE WITH FIND NO. 28

A	A
SH 1	SH 2

REVISION STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
†	8	MS35241-25	SCREW, PAN HD	28
	AR	SEE NOTE 5	SLEEVING	27
	1	1006225-3	HOOD, CONNECTOR	26
	244	1010738-2	CONTACT, ELEC, SOCKET	25
	244	1010738-1	CONTACT, ELEC, PIN	24
	1	1006225-1	HOOD, CONNECTOR	23
	~~1~~	~~1006225~~	~~HOOD, CONNECTOR~~	~~22~~
✱	221	1014341-11	WIRE, ELECTRICAL	21
✱	6.0	MIL-W-16878/4, E22, BRN	WIRE, ELECTRICAL	20
✱	6.0	MIL-W-16878/4, E22, WHT/RED	WIRE, ELECTRICAL	19
✱	6.0	MIL-W-16878/4, E22, ORG	WIRE, ELECTRICAL	18
✱	15.0	MIL-W-16878/4, E22, BLK	WIRE, ELECTRICAL	17
✱	239	MIL-W-16878/4, E22, WHT	WIRE, ELECTRICAL	16
	3	1000243-34	FERRULE, ELEC. COND	15
	2	1000242-34	FERRULE, ELEC. COND	14
	2	1000242-33	FERRULE, ELEC COND	13
	3	1000242-30	FERRULE, ELEC COND	12
✱	5.6	SEE NOTE 7	WIRE, BRAID	11
✱	11.1	SEE NOTE 7	WIRE, BRAID	10
✱	0.2	SEE NOTE 6	SLEEVING	9
✱	0.3	SEE NOTE 6	SLEEVING	8
✱	5.2	SEE NOTE 5	SLEEVING	7
✱	5.6	SEE NOTE 5	SLEEVING	6
✱	11.1	SEE NOTE 5	SLEEVING	5
	1	1014472-10	BAND MARKER, CABLE	4
	2	1014472-10A	BAND MARKER, CABLE	3
	1	1006269-1	CONNECTOR	2
	1	1010641-1	CONNECTOR	1

LIST OF MATERIALS

† NOT SHOWN SEE NOTE 11 ✱ DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498

DRAWN R.S. Daggy DATE 1 Dec 63
CHECKED H. Cappucci 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

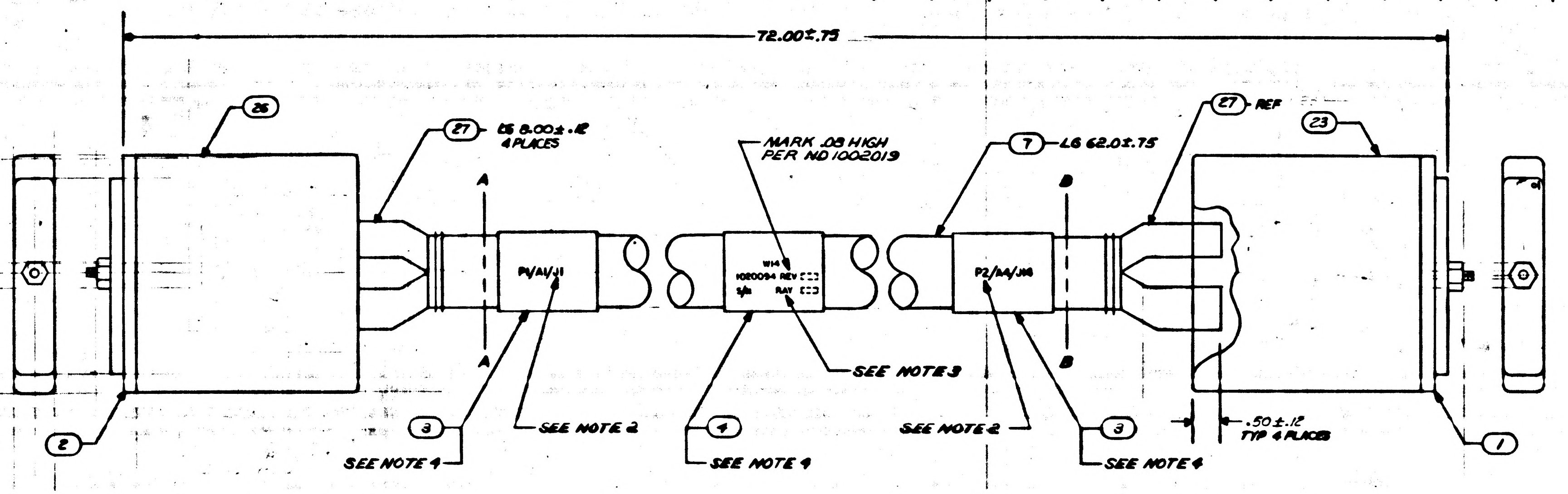
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W14
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020094
SCALE 1/1 WT SHEET 1 OF 2

1020094

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		
A	CHANGE PER TDRR 08130 DR. CHK. G Caggiano APPD.		KEG



ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	116	ORN	22	18	125	
	117	WHT/RED	22	19	123	
	118	BLK	22	17	121	
	119	BRN	22	20	122	
	120	BLK	22	17	124	
**	115	SHIELD		11	126	**
	114	WHT	22	16	128	
	113	WHT	22	16	127	
	110	WHT	22	16	129	
	109	WHT	22	16	130	
	112	WHT	22	21	131	
	83	BLK			132	
	111	WHT	22	21	139	
	82	BLK			140	
	108	WHT	22	21	159	
	81	BLK			160	
	107	WHT	22	21	153	
	80	BLK			154	
	106	WHT	22	21	141	
	79	BLK			142	
	105	WHT	22	21	133	
	78	BLK			134	
	104	WHT	22	21	135	
	77	BLK			136	ATTACH FIND NO. 6 AND 11 LG 66.5±.5
	103	WHT	22	21	143	
	76	BLK			144	
	102	WHT	22	21	151	
	75	BLK			152	
	101	WHT	22	21	161	
	74	BLK			162	
	100	WHT	22	21	163	
	73	BLK			164	
	99	WHT	22	21	149	
	72	BLK			150	
	98	WHT	22	21	157	
	71	BLK			158	
	97	WHT	22	21	137	
	70	BLK			138	
	96	WHT	22	21	167	
	69	BLK			168	
	95	WHT	22	21	155	
	68	BLK			156	
	94	WHT	22	21	147	
	67	BLK			148	
	93	WHT	22	21	165	
	66	BLK			166	
	92	WHT	22	21	177	
	65	BLK			178	
	91	WHT	22	21	175	
	64	BLK			176	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	90	WHT	22	21	145	
	63	BLK			146	
	89	WHT	22	21	183	
	62	BLK			184	
	88	WHT	22	21	169	
	61	BLK			170	
	87	WHT	22	21	171	
	60	BLK			172	
	86	WHT	22	21	181	
	59	BLK			182	
	85	WHT	22	21	179	
	58	BLK			180	
	84	WHT	22	21	173	
	57	BLK			174	
	47	WHT	22	21	203	
	56	BLK			204	
	46	WHT	22	21	185	
	55	BLK			186	
	45	WHT	22	21	187	
	54	BLK			188	
	44	WHT	22	21	189	
	53	BLK			190	
	43	WHT	22	21	191	
	52	BLK			192	
	42	WHT	22	21	193	
	51	BLK			194	ATTACH FIND NO. 5 AND 10 LG 66.5±.5
	41	WHT	22	21	195	
	50	BLK			196	
	40	WHT	22	21	207	
	49	BLK			208	
	39	WHT	22	21	205	
	48	BLK			206	
	24	WHT	22	21	201	
	23	BLK			202	
	38	WHT	22	16	197	
	37	WHT	22	16	199	
	36	WHT	22	16	200	
	35	WHT	22	16	198	
**	34	SHIELD		11	209	**
	33	WHT	22	16	221	
	32				224	
	31				216	
	30				215	ATTACH FIND NO. 5 AND 10 LG 66.5±.5
	29				234	
	28				220	
	27				219	
	26				233	
	25	WHT	22	16	214	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	22	WHT	22	16	213	
	21				232	
	20				218	
	19				217	
	18				231	
	17				212	
	16				240	
	15				236	
	14				237	
	13				241	
	12				239	
	11				211	
	10				223	
	9				228	
	8				227	
	7				222	
	6				230	
	5				238	
	4				229	
	3				235	
	2				226	
	1	WHT	22	16	225	
		SHIELD		11	210	**

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

1020094

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.S. Tracy DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

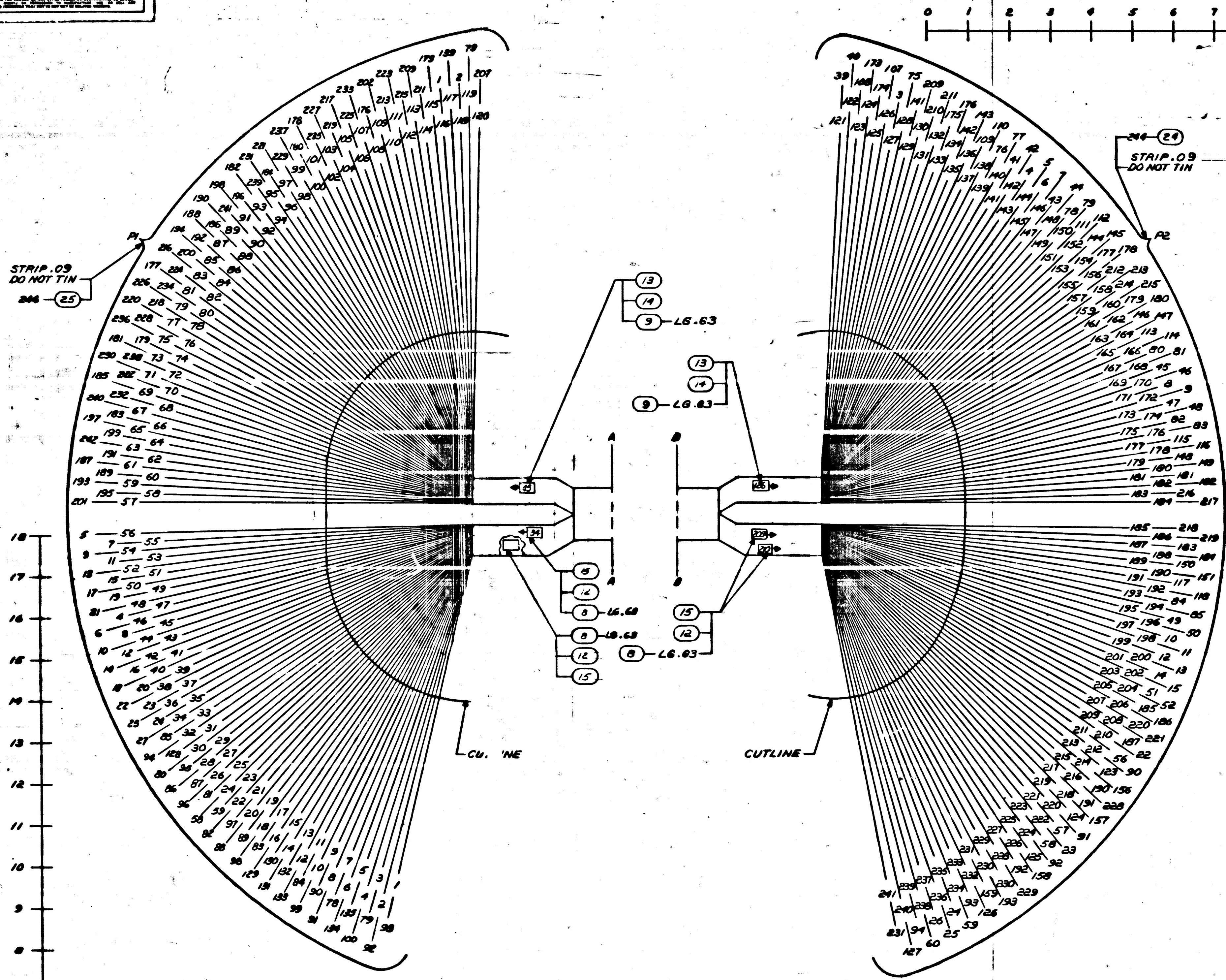
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

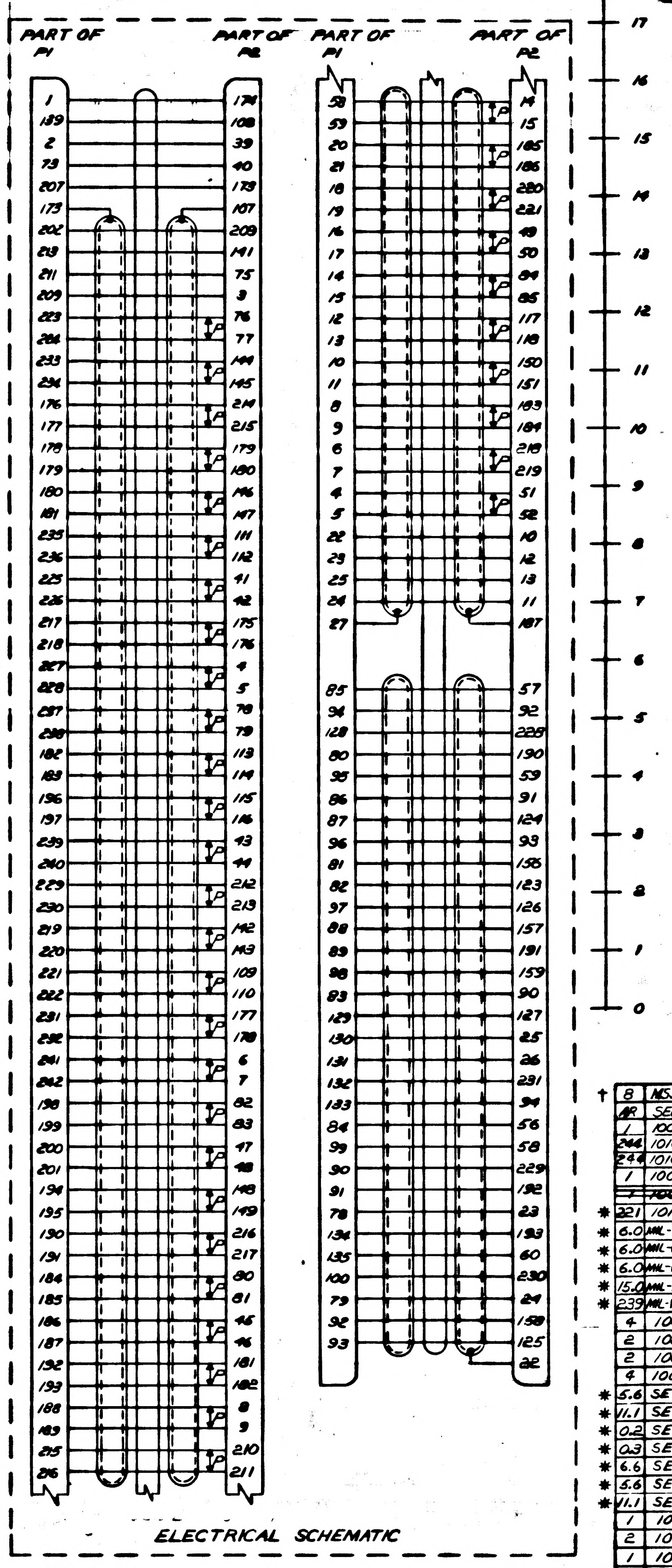
CABLE ASSEMBLY
W14
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020094
SCALE 1/1
WT
SHEET 2 OF 2

1020094

SYM	DESCRIPTION	DATE	APPROVAL
—	~~CL B RELEASE PER TORR~~ 0631B		
A	CHANGED PER TORR 08130 DR. [illegible] CHK. G. [illegible] APPD. [illegible]	[illegible] 64	NEB
B	CHANGED PER TORR 10451 DR S.T. [illegible] CHK. G.G.C APPD [illegible]	[illegible] 64	[illegible]





FOR INFORMATION ONLY
CLASS B RELEASE TORR NO 0631B DATE [illegible]

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2 GRADE I CLASS I CATEGORY I FOR FIND NO. 5 AWG 7/16, FOR FIND NO. 6 AWG 5/8, FOR FIND NO. 7 AWG 1 1/4, FOR FIND NO. 27 AWG 1
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 8 SIZE NO. 7/16 FOR FIND NO. 9 SIZE NO. 5/8
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 3/8 AWG 34 FOR FIND NO. 11 BRAID SIZE 9/16 AWG 34
8. ~~✱ DENOTES ATTACH FIND NO 7 LG 5.0~~
9. ~~DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 AND 2~~
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
11. REMOVE SCREWS FROM FIND NO. 23 AND FIND NO. 26 DISCARD AND REPLACE WITH FIND NO. 28

B	B
A	A
—	—
SH 1	SH 2

REVISION STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
†	8	MS35249-18	SCREW, FLAT HD	28
	AR	SEE NOTE 5	SLEEVING	27
	1	1006225-3	HOOD, CONNECTOR	26
	244	1010738-2	CONTACT, ELEC, SOCKET	25
	244	1010738-1	CONTACT, ELEC, PIN	24
	1	1006225-1	HOOD, CONNECTOR	23
	~~1~~	~~1006225~~	~~HOOD, CONNECTOR~~	~~22~~
✱	221	1014341-11	WIRE, ELECTRICAL	21
✱	6.0	MIL-W-16878/4, E22, BRN	WIRE, ELECTRICAL	20
✱	6.0	MIL-W-16878/4, E22, WHT/RED	WIRE, ELECTRICAL	19
✱	6.0	MIL-W-16878/4, E22, ORG	WIRE, ELECTRICAL	18
✱	15.0	MIL-W-16878/4, E22, BLK	WIRE, ELECTRICAL	17
✱	239	MIL-W-16878/4, E22, WHT	WIRE, ELECTRICAL	16
	4	1000243-34	FERRULE, ELEC. COND	15
	2	1000242-34	FERRULE, ELEC. COND	14
	2	1000243-41	FERRULE, ELEC COND	13
	4	1000242-30	FERRULE, ELEC COND	12
✱	5.6	SEE NOTE 7	WIRE, BRAID	11
✱	11.1	SEE NOTE 7	WIRE, BRAID	10
✱	0.2	SEE NOTE 6	SLEEVING	9
✱	0.3	SEE NOTE 6	SLEEVING	8
✱	6.6	SEE NOTE 5	SLEEVING	7
✱	5.6	SEE NOTE 5	SLEEVING	6
✱	11.1	SEE NOTE 5	SLEEVING	5
	1	1014472-10	BAND MARKER, CABLE	4
	2	1014472-10A	BAND MARKER, CABLE	3
	1	1006269-1	CONNECTOR	2
	1	1010641-144	CONNECTOR	1

LIST OF MATERIALS

† NOT SHOWN SEE NOTE 11 ✱ DENOTES LENGTH IN FEET

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4395
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible] 2-4-64
SMT APPROVAL [illegible]
SMT APPROVAL [illegible]

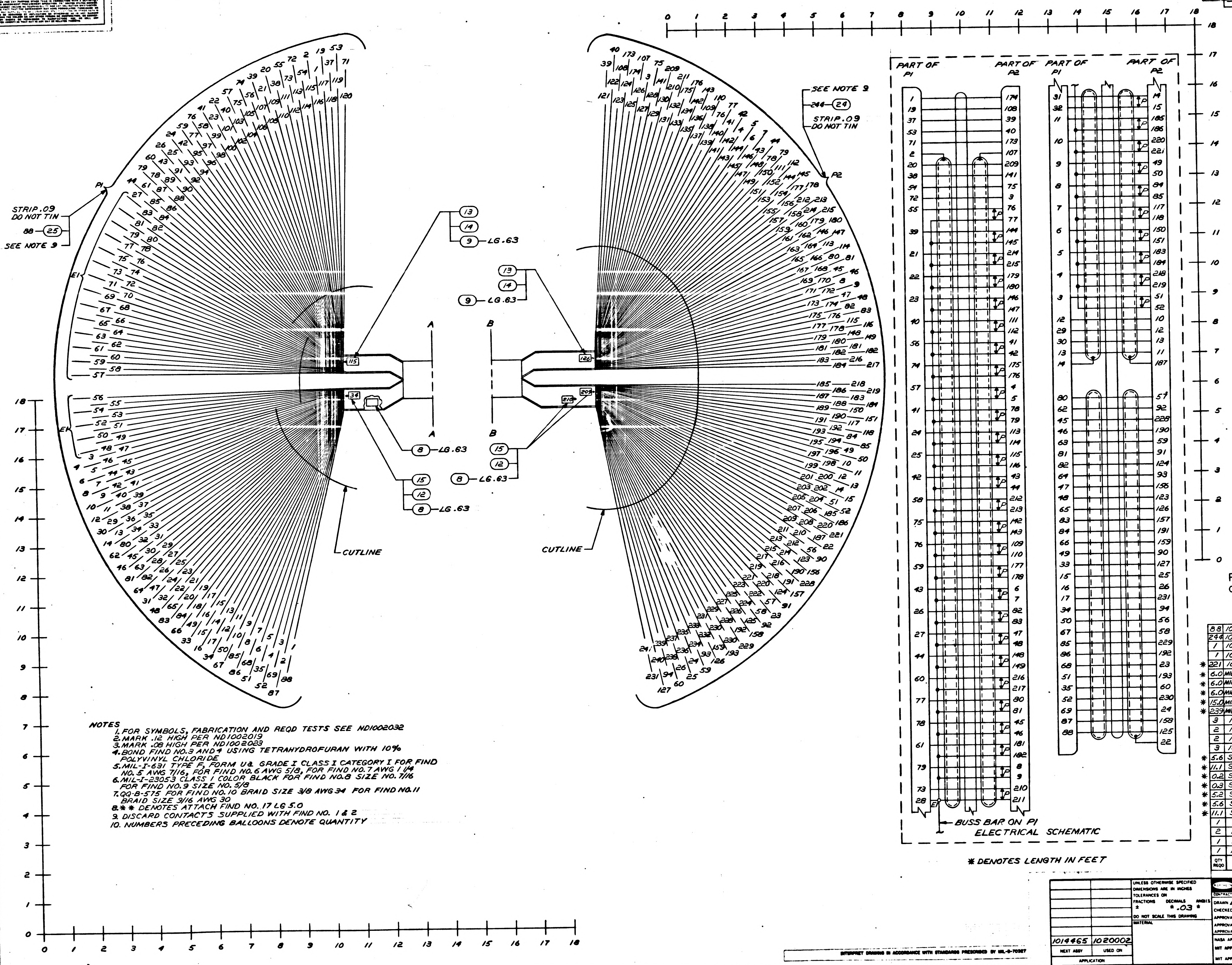
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W14
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020094
SCALE 1/1
WT
SHEET 1 OF 2

1020094

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		



NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO.3 AND 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2 GRADE I CLASS I CATEGORY I FOR FIND NO. 5 AWG 7/16, FOR FIND NO.6 AWG 5/8, FOR FIND NO.7 AWG 1 1/4
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO.8 SIZE NO. 7/16 FOR FIND NO.9 SIZE NO. 5/8
7. QQ-B-575 FOR FIND NO. 10 BRAID SIZE 3/8 AWG 34 FOR FIND NO.11 BRAID SIZE 9/16 AWG 30
8. ✱✱ DENOTES ATTACH FIND NO. 17 LG 5.0
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY

✱ DENOTES LENGTH IN FEET

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	IND NO
	88	1010738-2	CONTACT, ELEC, SOCKET	5
	244	1010738-1	CONTACT, ELEC, PIN	4
	1	1006225-1	HOOD, CONNECTOR	3
	1	1006226	HOOD, CONNECTOR	2
✱	221	1014341-11	WIRE, ELECTRICAL	1
✱	6.0	MIL-W-16878/4, E22, BRN	WIRE, ELECTRICAL	0
✱	6.0	MIL-W-16878/4, E22, WHT/RED	WIRE, ELECTRICAL	9
✱	6.0	MIL-W-16878/4, E22, ORG	WIRE, ELECTRICAL	8
✱	15.0	MIL-W-16878/4, E22, BLK	WIRE, ELECTRICAL	7
✱	239	MIL-W-16878/4, E22, WHT	WIRE, ELECTRICAL	6
	3	1000243-34	FERRULE, ELEC. COND	5
	2	1000242-34	FERRULE, ELEC. COND	4
	2	1000242-33	FERRULE, ELEC COND	3
	3	1000242-30	FERRULE, ELEC COND	2
✱	5.6	SEE NOTE 7	WIRE, BRAID	1
✱	11.1	SEE NOTE 7	WIRE, BRAID	0
✱	0.2	SEE NOTE 6	SLEEVING	9
✱	0.3	SEE NOTE 6	SLEEVING	9
✱	5.2	SEE NOTE 5	SLEEVING	7
✱	5.6	SEE NOTE 5	SLEEVING	6
✱	11.1	SEE NOTE 5	SLEEVING	5
	1	1014472-8	BAND MARKER, CABLE	4
	2	1014472-8A	BAND MARKER, CABLE	3
	1	1006690	CONNECTOR	2
	1	1010641-1	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498

DRAWN R.S. Tracy DATE 4 Dec 63
CHECKED A. Cyprian 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL 11 Feb 64
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

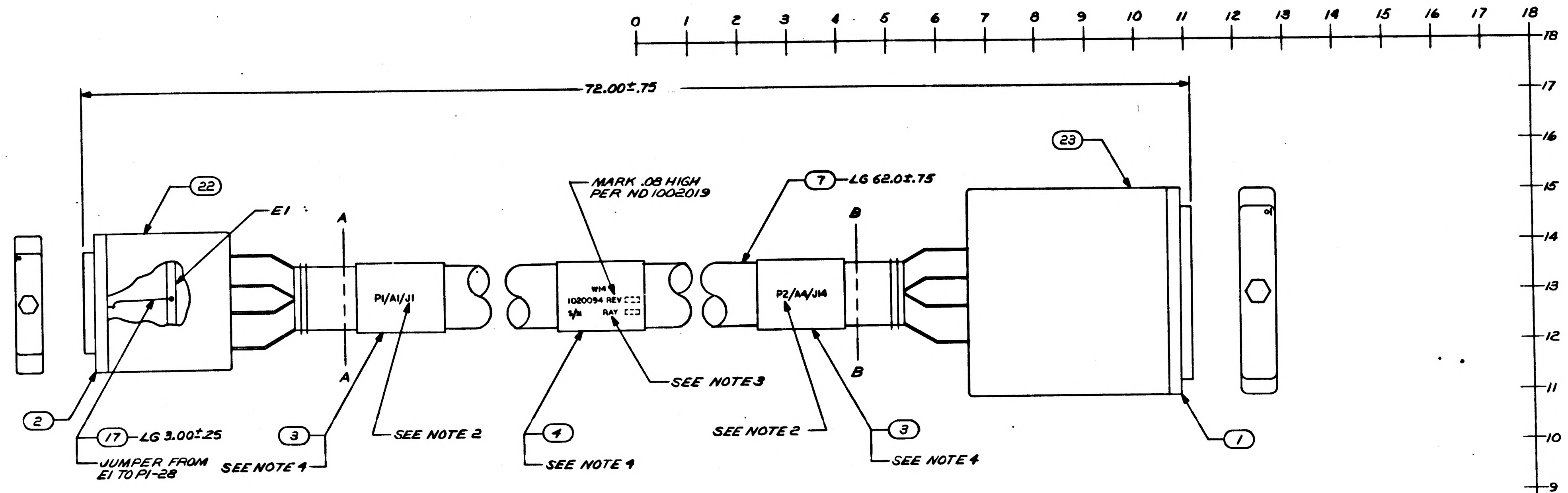
CABLE ASSEMBLY
W14
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020094
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR		



ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	116	ORN	22	18	125	
	117	WHT/RED	22	19	123	
	118	BLK	22	17	121	
	119	BRN	22	20	122	
	120	BLK	22	17	124	
**	115	SHIELD		11	126	** ATTACH FIND NO. 6 AND 11 LG 66.5±.5
	114	WHT	22	16	128	
	113	WHT	22	16	127	
	110	WHT	22	16	129	
	109	WHT	22	16	130	
	112	WHT	22	21	131	
	83	BLK			132	
	111	WHT	22	21	139	
	82	BLK			140	
	108	WHT	22	21	159	
	81	BLK			160	
	107	WHT	22	21	153	
	80	BLK			154	
	106	WHT	22	21	141	
	79	BLK			142	
	105	WHT	22	21	133	
	78	BLK			134	
	104	WHT	22	21	135	
	77	BLK			136	
	103	WHT	22	21	143	
	76	BLK			144	
	102	WHT	22	21	151	
	75	BLK			152	
	101	WHT	22	21	161	
	74	BLK			162	
	100	WHT	22	21	163	
	73	BLK			164	
	99	WHT	22	21	149	
	72	BLK			150	
	98	WHT	22	21	157	
	71	BLK			158	
	97	WHT	22	21	137	
	70	BLK			138	
	96	WHT	22	21	167	
	69	BLK			168	
	95	WHT	22	21	155	
	68	BLK			156	
	94	WHT	22	21	147	
	67	BLK			148	
	93	WHT	22	21	165	
	66	BLK			166	
	92	WHT	22	21	177	
	65	BLK			178	
	91	WHT	22	21	175	
	64	BLK			176	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	90	WHT	22	21	145	
	63	BLK			146	
	89	WHT	22	21	183	
	62	BLK			184	
	88	WHT	22	21	169	
	61	BLK			170	
	87	WHT	22	21	171	
	60	BLK			172	
	86	WHT	22	21	181	
	59	BLK			182	
	85	WHT	22	21	179	
	58	BLK			180	
	84	WHT	22	21	173	
	57	BLK			174	
	47	WHT	22	21	203	ATTACH FIND NO. 5 AND 10 LG 66.5±.5
	56	BL			204	
	46	WH	22	21	185	
	55	BL			186	
	45	WH	22	21	187	
	54	BLK			188	
	44	WHT	22	21	189	
	53	BLK			190	
	43	WHT	22	21	191	
	52	BLK			192	
	42	WHT	22	21	193	
	51	BLK			194	
	41	WHT	22	21	195	
	50	BLK			196	
	40	WHT	22	21	207	
	49	BLK			208	
	39	WHT	22	21	205	
	48	BLK			206	
	24	WHT	22	21	201	
	23	BLK			202	
	38	WHT	22	16	197	
	37	WHT	22	16	199	
	36	WHT	22	16	200	
	35	WHT	22	16	198	
**	34	SHIELD		11	209	**
	33	WHT	22	16	221	ATTACH FIND NO. 5 AND 10 LG 66.5±.5
	32				224	
	31				216	
	30				215	
	29				234	
	28				220	
	27				219	
	26				233	
	25	WHT	22	16	214	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	22	WHT	22	16	213	
	21				232	
	20				218	
	19				217	
	18				231	
	17				212	
	16				240	
	15				236	
	14				237	
	13				241	
	12				239	
	11				211	
	10				223	
	9				228	
	8				227	
	7				222	
	6				230	
	5				238	
	4				229	
	3				235	
	2				226	
	1	WHT	22	16	225	
		SHIELD		11	210	**

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Tracy DATE 4 Dec 63
CHECKED 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

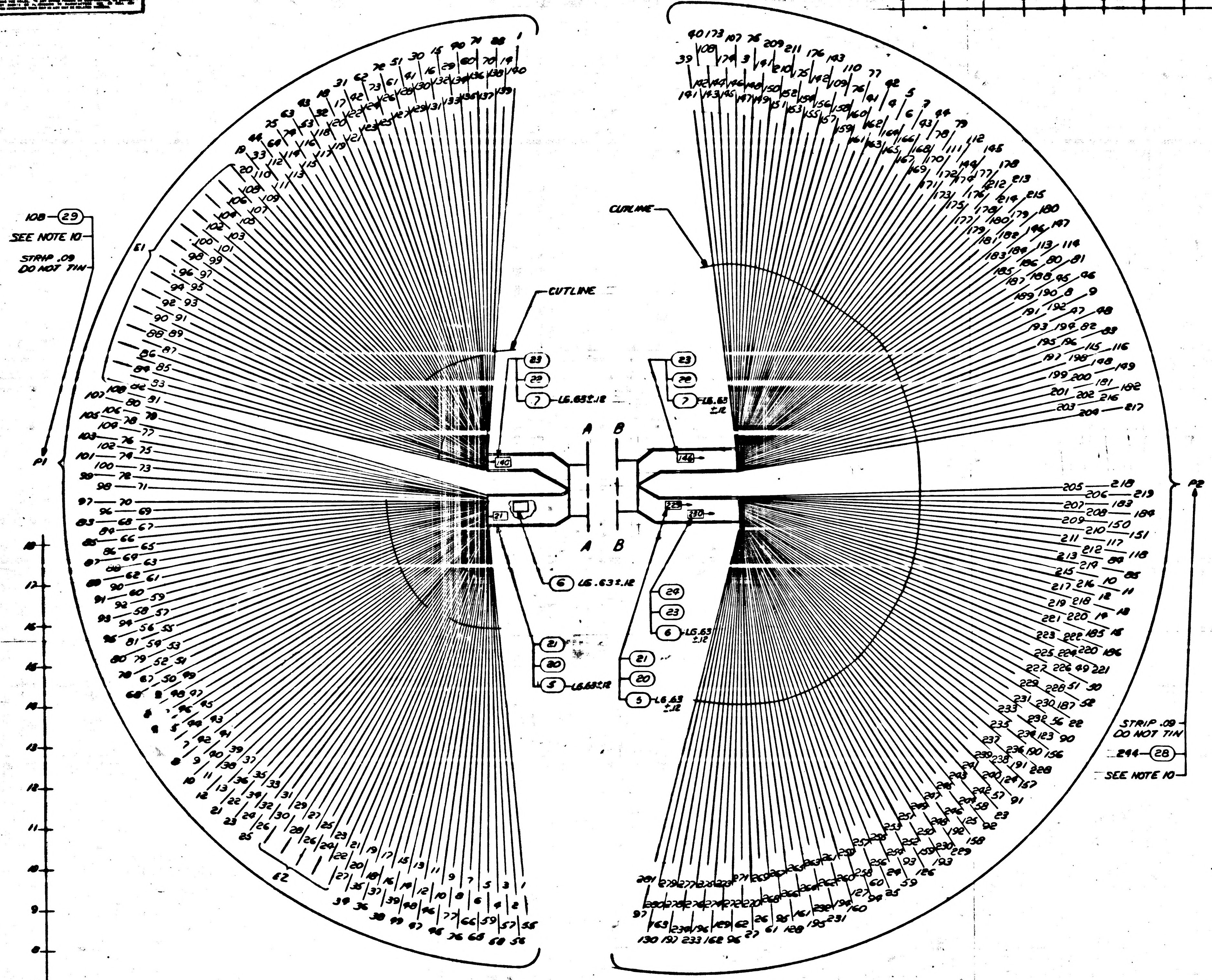
CABLE ASSEMBLY
W14
AGC/CTS OPERATION CONSOLE

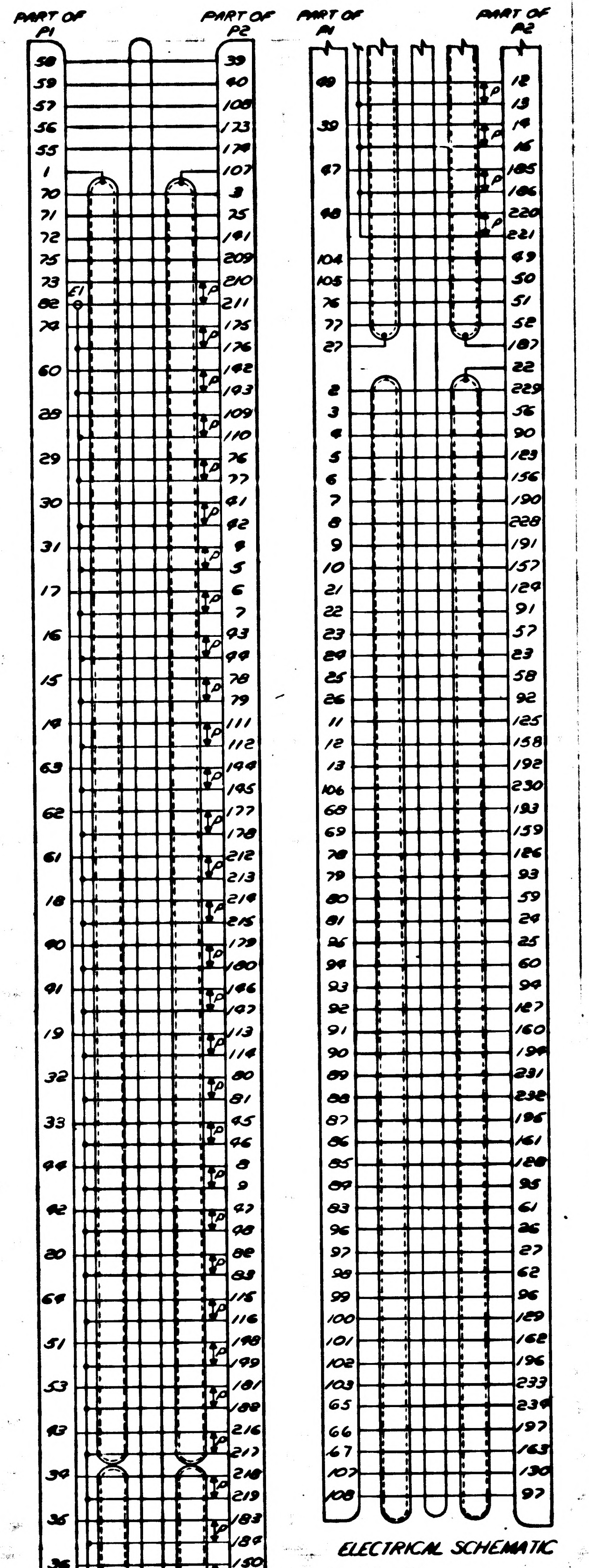
CODE IDENT NO — SIZE J NASA DRAWING NO 1020094
SCALE 1/1 WT SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. [illegible] CHK [illegible] APPD [illegible]	[illegible]	[illegible]





ELECTRICAL SCHEMATIC

✱ DENOTES LENGTH IN FEET

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2, GRADE A, CLASS 1, CATEGORY 1 FOR FIND NO. 8 AWG 7/16 FOR FIND NO. 14 AWG 1 1/2 FOR FIND NO. 26 AWG 5/8 FOR FIND NO. 27 AWG 3/4
6. ✱✱ DENOTES ATTACH FIND NO. 12 LG 5.0
7. QQ-B-575 FOR FIND NO. 15 BRAID SIZE 21/32, AWG 34 FOR FIND NO. 16 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 17 BRAID SIZE 3/8 AWG 34
8. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 5 SIZE NO. 7/16, FOR FIND NO. 6 SIZE NO. 1/2, FOR FIND NO. 7 SIZE NO. 5/8
10. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2
11. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

A	A
SHEET 1 OF 2	SHEET 2 OF 2
REVISION STATUS OF SHEETS	

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	108	1010738-2	CONTACT, ELEC, SOCKET	29
	244	1010738-1	CONTACT, ELEC. PIN	28
✱	5.7	SEE NOTE 5	SLEEVING	27
✱	5.7	SEE NOTE 5	SLEEVING	26
✱	2220	1019[illegible]1-11	WIRE, ELECTRICAL	25
	1	1000293-36	FERRULE ELEC CONDUCTOR	24
	3	1000292-33	FERRULE, ELEC CONDUCTOR	23
	2	1000292-34	FERRULE, ELEC CONDUCTOR	22
	2	1000293-34	FERRULE, ELEC CONDUCTOR	21
	2	1000292-30	FERRULE, ELEC CONDUCTOR	20
	1	1006225-1	HOOD, CONNECTOR	19
	1	1006227	HOOD, CONNECTOR	18
✱	5.7	SEE NOTE 7	WIRE, BRAID	17
✱	5.7	SEE NOTE 7	WIRE, BRAID	16
✱	5.7	SEE NOTE 7	WIRE, BRAID	15
✱	5.3	SEE NOTE 5	SLEEVING	14
✱	330.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	13
✱	13.2	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	12
✱	6.0	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	11
✱	6.0	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	10
✱	6.0	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	9
✱	5.7	SEE NOTE 5	SLEEVING	8
✱	0.2	SEE NOTE 9	SLEEVING	7
✱	0.2	SEE NOTE 9	SLEEVING	6
✱	0.2	SEE NOTE 9	SLEEVING	5
	2	1019472-11A	BAND MARKER, CABLE	4
	7	1019472-11	BAND MARKER, CABLE	3
	1	1010411-1	CONNECTOR	2
	1	1010691-2	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

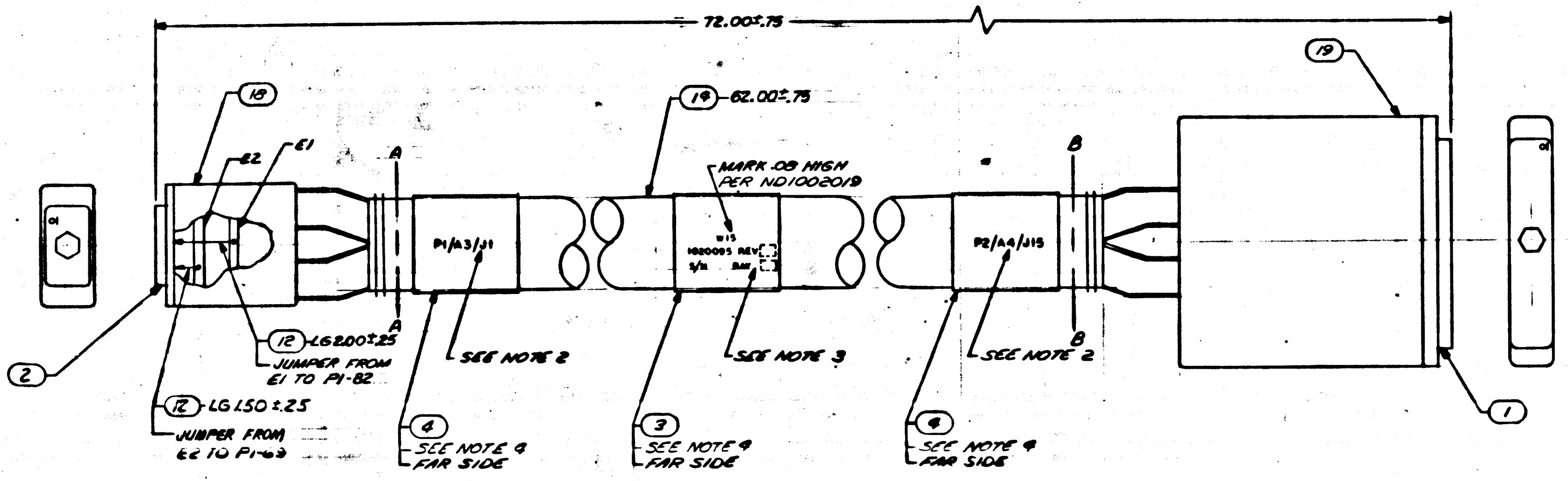
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN P J D[illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020095
SCALE 1/1
WT
SHEET 1 OF 2

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
–	CLASS B RELEASED PER TDRR	–	–
A	CHANGED PER TDRR 07350 DR CH APPD	APRIL 13 1964	



ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	22	12	144	
	4	BLK	22	12	141	
	1	ORN	22	11	145	
	3	WHT/RED	22	9	143	
	5	BRN	22	10	142	
ATTACH FIND NO.17 & 8 LG 68.00 ±.25	77	WHT	22	13	225	
	78	WHT	22	13	226	
	8	WHT	22	13	227	
	9	WHT	22	13	228	
	10	WHT	22	25	215	
	11	BLK			216	
	13	WHT	22	25	223	
	22	BLK			224	
	12	WHT	22	25	221	
	23	BLK			222	
	20	WHT	22	25	205	
	24	BLK			206	
	19	WHT	22	25	207	
	25	BLK			208	
	18	WHT	22	25	209	
	26	BLK			210	
	17	WHT	22	25	211	
	27	BLK			212	
	16	WHT	22	25	213	
	28	BLK			214	
	15	WHT	22	25	219	
	29	BLK			220	
	14	WHT	22	25	217	
	30	BLK			218	
**	21	SHLD			229	**
ATTACH FIND NO. 16 & 28 LG 68.00±.25	31	WHT	22	13	244	
	32				243	
	33				242	
	34				241	
	35				240	
	36				239	
	37				247	
	38				246	
	39				245	
	40				238	
	41				237	
	42				236	
	43				235	
	44				234	
	45				233	
	46				232	
	47				231	
	48	WHT	22	13	248	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	79	WHT	22	13	249	
	50				250	
	49				251	
	52				252	
	53				253	
	54				254	
	55				255	
	56				256	
	57				257	
	58				258	
	59				259	
	60				260	
	61				261	
	62				262	
	63				263	
	64				264	
	65				265	
	66				266	
	67				267	
	68				268	
	69				269	
	70				270	
	71				271	
	72				272	
	73				273	
	74				274	
	75				275	
	76				276	
	6				277	
	7				278	
	51				279	
	80				280	
	81	WHT	22	13	281	
		SHLD			230	**
** ATTACH FIND NO. 15 & 27 LG 68.00±.25	140	SHLD			146	**
	137	WHT	22	13	147	
	136	WHT	22	13	148	
	126	WHT	22	13	149	
	114	WHT	22	13	150	
	139	WHT	22	25	171	
	108	BLK			172	
	138	WHT	22	25	157	
	107	BLK			158	
	135	WHT	22	25	155	
	106	BLK			156	
	134	WHT	22	25	181	
	105	BLK			182	
	133	WHT	22	25	159	
	104	BLK			160	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	132	WHT	22	25	169	
	103	BLK			170	
	131	WHT	22	25	167	
	102	BLK			168	
	130	WHT	22	25	161	
	101	BLK			162	
	129	WHT	22	25	183	
	100	BLK			184	
	128	WHT	22	25	199	
	99	BLK			200	
	127	WHT	22	25	177	
	98	BLK			178	
	125	WHT	22	25	151	
	97	BLK			152	
	124	WHT	22	25	175	
	96	BLK			176	
	123	WHT	22	25	193	
	95	BLK			194	
	122	WHT	22	25	163	
	94	BLK			164	
	121	WHT	22	25	165	
	93	BLK			166	
	120	WHT	22	25	179	
	92	BLK			180	
	119	WHT	22	25	187	
	91	BLK			188	
	118	WHT	22	25	203	
	90	BLK			204	
	117	WHT	22	25	201	
	89	BLK			202	
	116	WHT	22	25	173	
	88	BLK			174	
	115	WHT	22	25	153	
	87	BLK			154	
	113	WHT	22	25	197	
	86	BLK			198	
	112	WHT	22	25	191	
	85	BLK			192	
	111	WHT	22	25	189	
	84	BLK			190	
	110	WHT	22	25	185	
	83	BLK			186	
	109	WHT	22	25	195	
	82	BLK			196	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0631 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

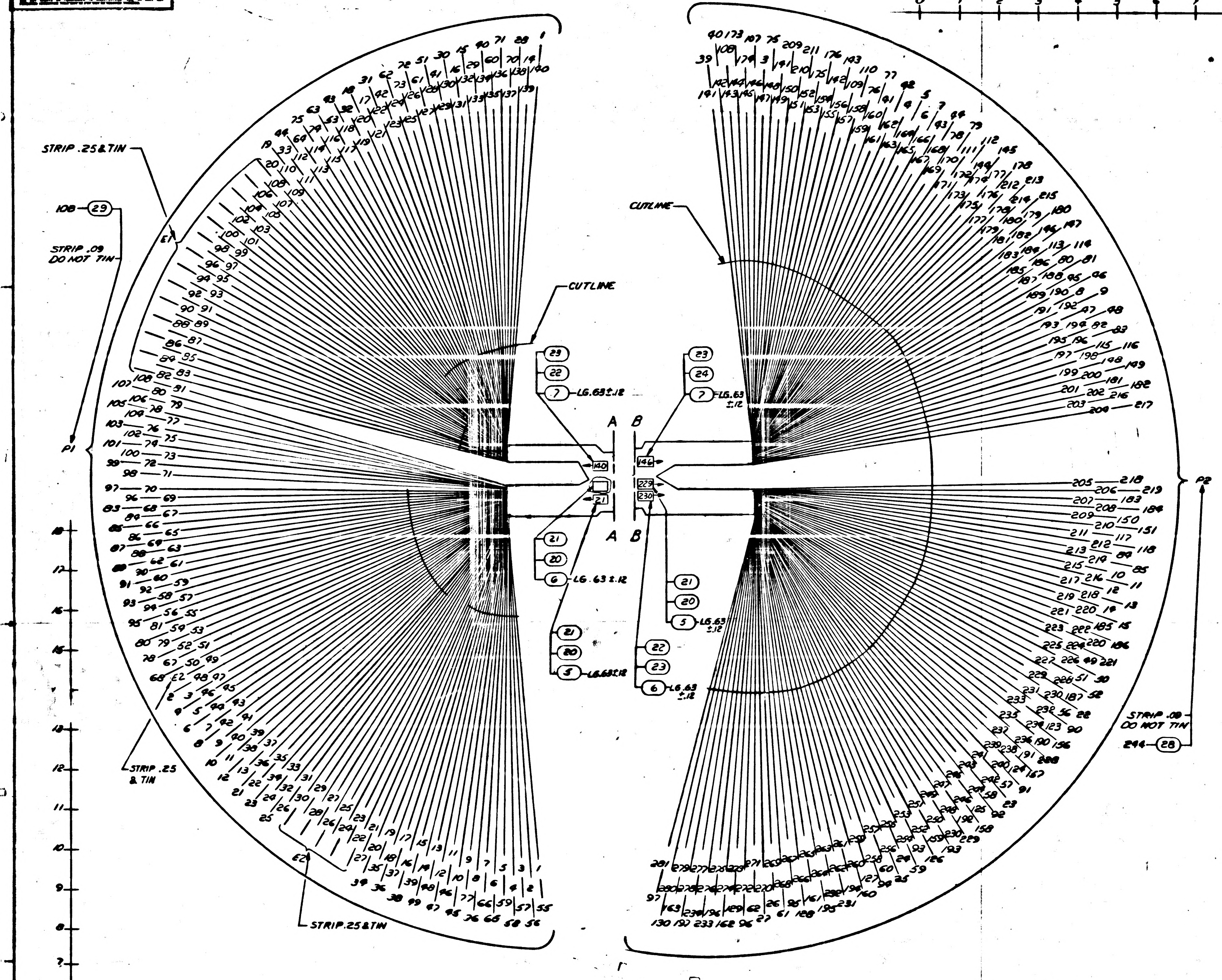
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4911
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

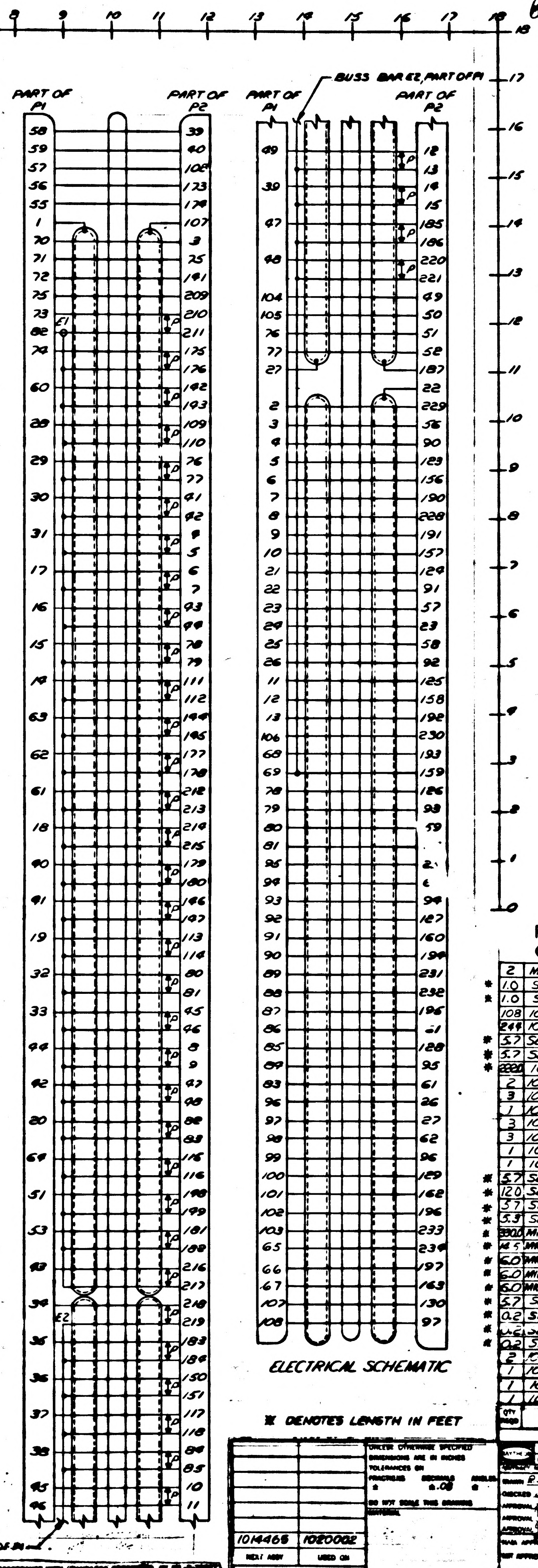
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 1020095
SCALE 1/1
WT
SHEET 2 OF 2

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
-	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. CH APPD	APRIL 13,1964	
B	CHANGED PER TDRR 10454 DR CHK B.G.C APPD	23 JUN 64	KCB





ELECTRICAL SCHEMATIC

* DENOTES LENGTH IN FEET

NOTES

1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2, GRADE A, CLASS 1, CATEGORY 1 FOR FIND NO. 8 AWG 7/16 FOR FIND NO. 14 AWG 1 1/2 FOR FIND NO. 26 AWG 5/8 FOR FIND NO. 27 AWG 3/4, FOR FIND NO. 30 1AWG, FOR FIND NO. 31 1 1/4 AWG
~~6. ** DENOTES ATTACH FIND NO. 12 LG 5.0~~
7. QQ-B-575 FOR FIND NO. 15 BRAID SIZE 21/32, AWG 34 FOR FIND NO. 16 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 17 BRAID SIZE 3/8 AWG 34
9. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 5 SIZE NO. 7/16, FOR FIND NO. 6 SIZE NO. 1/2, FOR FIND NO. 7 SIZE NO. 5/8
~~10. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2~~
11. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
12. REMOVE CONN. HDWR SUPPLIED WITH FIND NO. 18 & REPLACE USING FIND NO. 32

B	B
A	A
SHEET 1 OF 2	SHEET 2 OF 2

REVISION STATUS OF SHEETS

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	2	MS35249-18	SCREW, FLAT HD	32
*	1.0	SEE NOTE 5	SLEEVING	31
*	1.0	SEE NOTE 5	SLEEVING	30
	108	1010738-2	CONTACT, ELEC, SOCKET	29
	244	1010738-1	CONTACT, ELEC, PIN	28
*	5.7	SEE NOTE 5	SLEEVING	27
*	5.7	SEE NOTE 5	SLEEVING	26
*	2220	1019341-11	WIRE, ELECTRICAL	25
	2	1000293-36	FERRULE, ELEC CONDUCTOR	24
	3	1000292-33	FERRULE, ELEC CONDUCTOR	23
	1	1000293-37	FERRULE, ELEC CONDUCTOR	22
	3	1000293-34	FERRULE, ELEC CONDUCTOR	21
	3	1000292-30	FERRULE, ELEC CONDUCTOR	20
	1	1006225-1	HOOD, CONNECTOR	19
	1	1006227	HOOD, CONNECTOR	18
*	5.7	SEE NOTE 7	WIRE, BRAID	17
*	120	SEE NOTE 7	WIRE, BRAID	16
*	57	SEE NOTE 7	WIRE, BRAID	15
*	5.3	SEE NOTE 5	SLEEVING	14
*	330.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	13
*	14.5	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	12
*	6.0	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	11
*	6.0	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	10
*	6.0	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	9
*	5.7	SEE NOTE 5	SLEEVING	8
*	0.2	SEE NOTE 9	SLEEVING	7
*	0.2	SEE NOTE 9	SLEEVING	6
*	0.2	SEE NOTE 9	SLEEVING	5
	2	1019972-11A	BAND MARKER, CABLE	4
	1	1019972-11	BAND MARKER, CABLE	3
	1	1010611-1	CONNECTOR	2
	1	1010691-244	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R J D DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

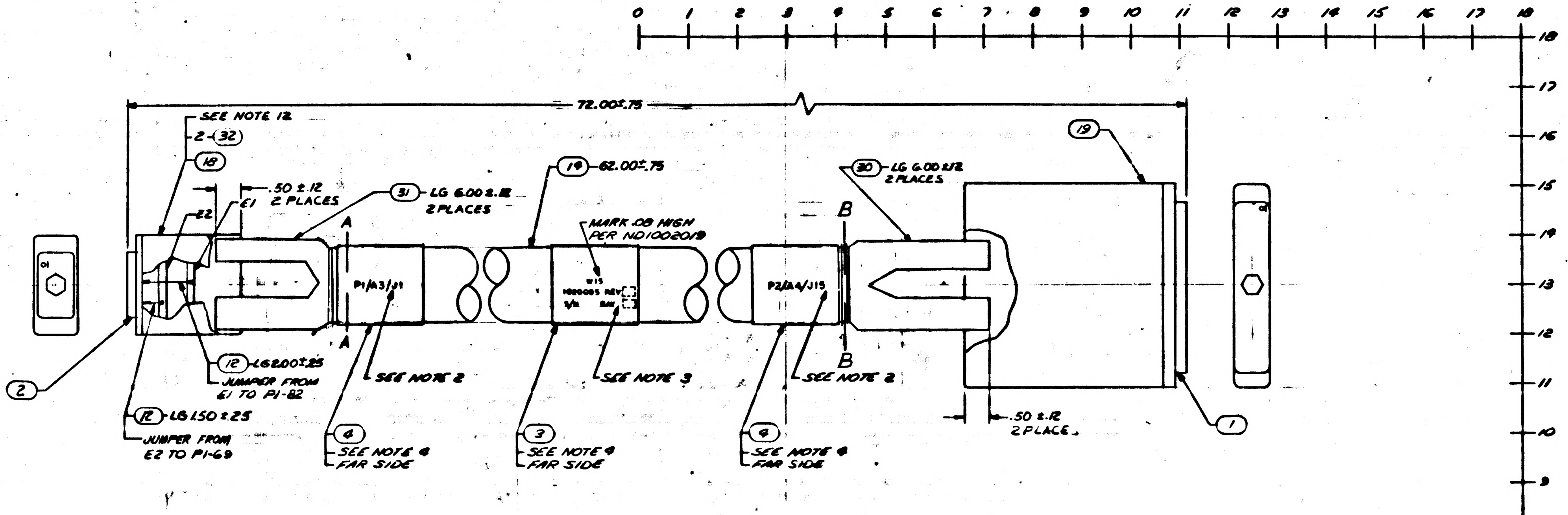
CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. SIZE J NASA DRAWING NO. 1020095
SCALE 1/1 WT SHEET 1 OF 2

1020095

K20095

SYM	DESCRIPTION	DATE	APPROVED
① –	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR B.Kat... CHK ... APPD	APRIL 13 1964	KCB
B	CHANGED PER TDRR 10458 DR B.K... CHK G.C.C. APPD	23 JUN 64	KCB


72.00±.75
SEE NOTE 12
2-(32)
(18)
.50 ±.12 2 PLACES
E1
E2
(31)-LG 6.00±.12 2 PLACES
A
(14)-62.00±.75
MARK .08 HIGH PER ND1002019
W15 1020095 REV S/N
(30)-LG 6.00±.12 2 PLACES
B
(19)
P1/A3/J1
P2/A4/J15
(12)-LG 2.00±.25 JUMPER FROM E1 TO P1-82
SEE NOTE 2
SEE NOTE 3
SEE NOTE 2
(2)
(12)-LG 1.50±.25 JUMPER FROM E2 TO P1-69
(4) SEE NOTE 4 FAR SIDE
(3) SEE NOTE 4 FAR SIDE
(4) SEE NOTE 4 FAR SIDE
.50 ±.12 2 PLACES
(1)
01
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	22	12	144	
	4	BLK	22	12	141	
	1	ORN	22	11	145	
	3	WHT/RED	22	9	143	
	5	BRN	22	10	142	
ATTACH FIND NO.17 & 8 LG 68.00 ±.25	77	WHT	22	13	225	
	78	WHT	22	13	226	
	8	WHT	22	13	227	
	9	WHT	22	13	228	
	10	WHT	22	25	215	
	11	BLK			216	
	13	WHT	22	25	223	
	22	BLK			224	
	12	WHT	22	25	221	
	23	BLK			222	
	20	WHT	22	25	205	
	24	BLK			206	
	19	WHT	22	25	207	
	25	BLK			208	
	18	WHT	22	25	209	
	26	BLK			210	
	17	WHT	22	25	211	
	27	BLK			212	
	16	WHT	22	25	213	
	28	BLK			214	
	15	WHT	22	25	219	
	29	BLK			220	
	14	WHT	22	25	217	
	30	BLK			218	
**	21	SHLD			229	**
ATTACH FIND NO. 16 & 26 LG 68.00±.25	31	WHT	22	13	244	
	32				243	
	33				242	
	34				241	
	35				240	
	36				239	
	37				247	
	38				246	
	39				245	
	40				238	
	41				237	
	42				236	
	43				235	
	44				234	
	45				233	
	46				232	
	47				231	
	48	WHT	22	13	248	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	79	WHT	22	13	249	
	50				250	
	49				251	
	52				252	
	53				253	
	54				254	
	55				255	
	56				256	
	57				257	
	58				258	
	59				259	
	60				260	
	61				261	
	62				262	
	63				263	
	64				264	
	65				265	
	66				266	
	67				267	
	68				268	
	69				269	
	70				270	
	71				271	
	72				272	
	73				273	
	74				274	
	75				275	
	76				276	
	6				277	
	7				278	
	51				279	
	80				280	
	81	WHT	22	13	281	
		SHLD			230	**
**	140	SHLD			146	**
ATTACH FIND NO. 16 & 27 LG 68.00±.75	137	WHT	22	13	147	
	136	WHT	22	13	148	
	126	WHT	22	13	149	
	114	WHT	22	13	150	
	139	WHT	22	25	171	
	108	BLK			172	
	138	WHT	22	25	157	
	107	BLK			158	
	135	WHT	22	25	155	
	106	BLK			156	
	134	WHT	22	25	181	
	105	BLK			182	
	133	WHT	22	25	159	
	104	BLK			160	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	132	WHT	22	25	169	
	103	BLK			170	
	131	WHT	22	25	167	
	102	BLK			168	
	130	WHT	22	25	161	
	101	BLK			162	
	129	WHT	22	25	183	
	100	BLK			184	
	128	WHT	22	25	199	
	99	BLK			200	
	127	WHT	22	25	177	
	98	BLK			178	
	125	WHT	22	25	151	
	97	BLK			152	
	124	WHT	22	25	175	
	96	BLK			176	
	123	WHT	22	25	193	
	95	BLK			194	
	122	WHT	22	25	163	
	94	BLK			164	
	121	WHT	22	25	165	
	93	BLK			166	
	120	WHT	22	25	179	
	92	BLK			180	
	119	WHT	22	25	187	
	91	BLK			188	
	118	WHT	22	25	203	
	90	BLK			204	
	117	WHT	22	25	201	
	89	BLK			202	
	116	WHT	22	25	173	
	88	BLK			174	
	115	WHT	22	25	153	
	87	BLK			154	
	113	WHT	22	25	197	
	86	BLK			198	
	112	WHT	22	25	191	
	85	BLK			192	
	111	WHT	22	25	189	
	84	BLK			190	
	110	WHT	22	25	185	
	83	BLK			186	
	109	WHT	22	25	195	
	82	BLK			196	

** DENOTES ATTACH FIND NO. 12 LG 8.00 ±.12

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

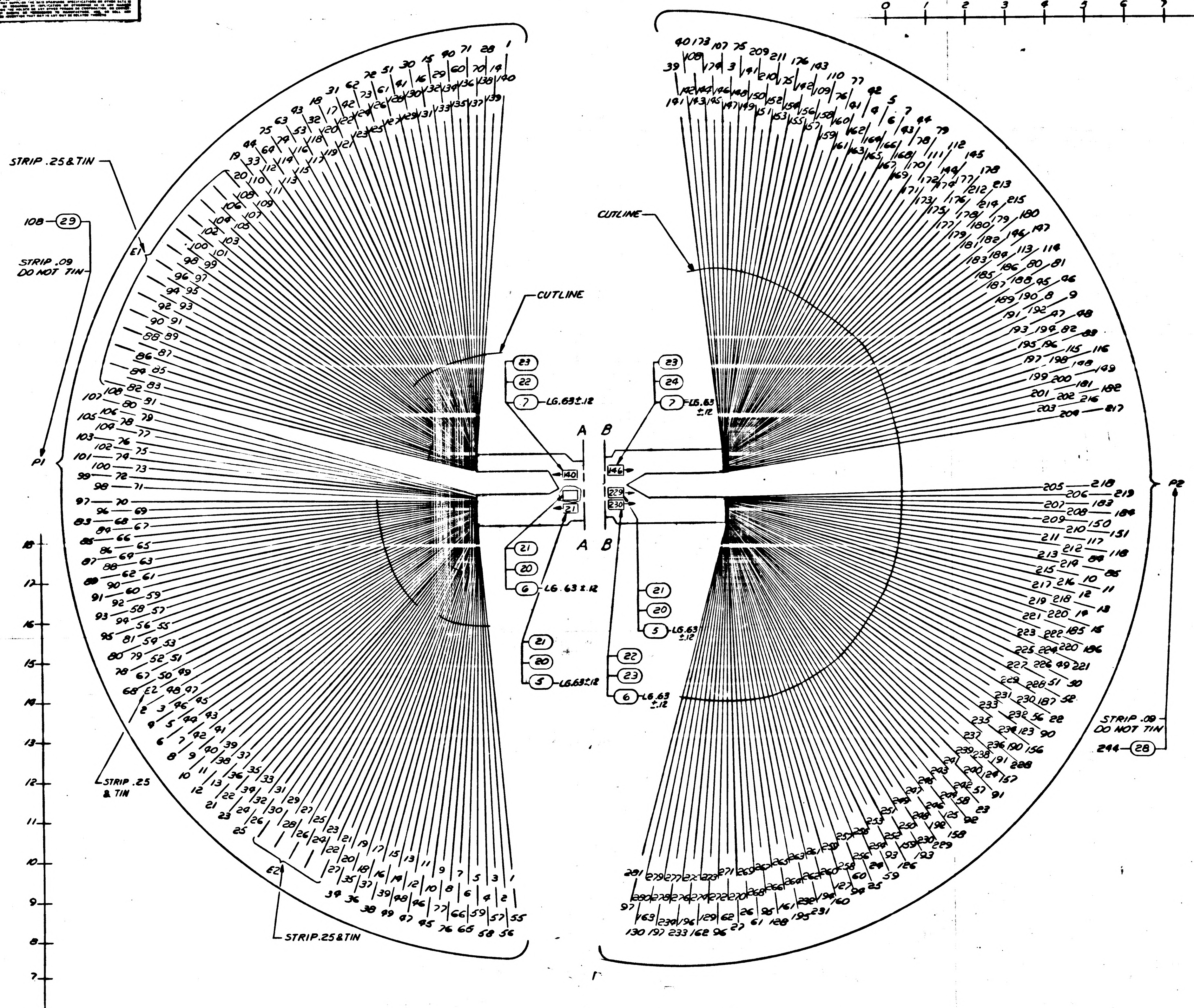
CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

DRAWN R.O... DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL
NASA APPROVAL

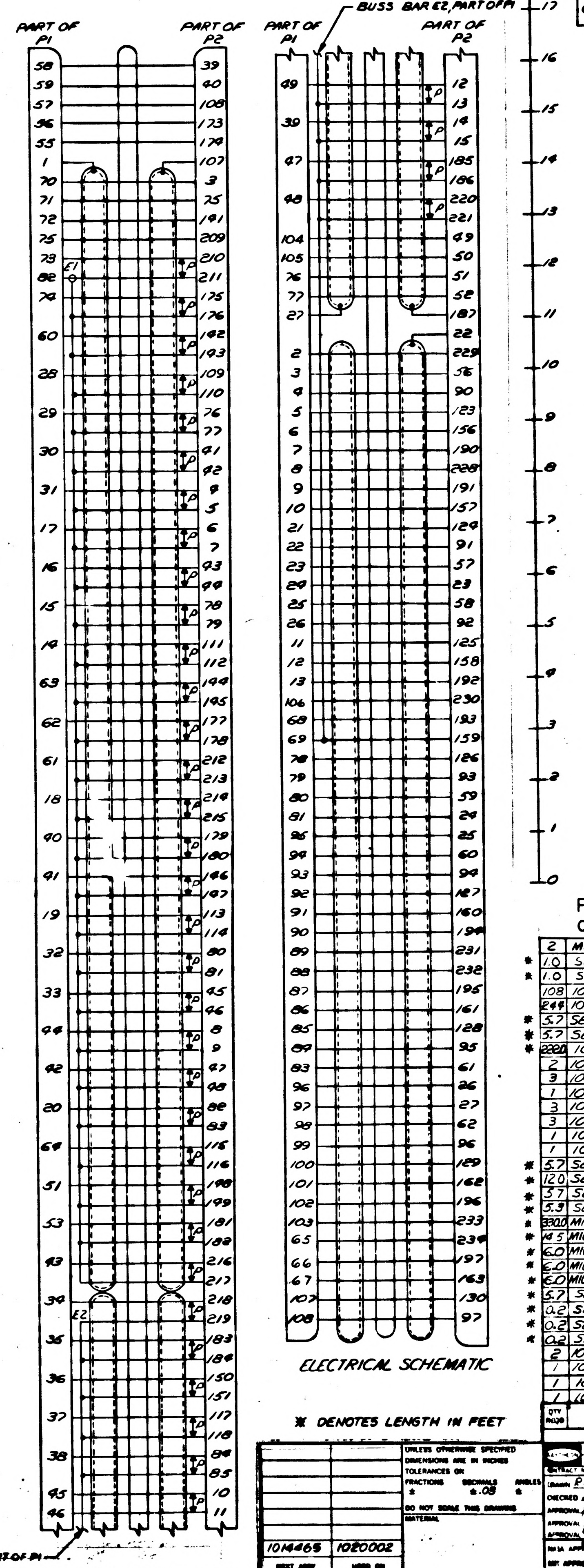
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020095
SCALE 1/1
WT
SHEET 2 OF 2

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. CHK APPD	APRIL 13, 1964	
B	CHANGED PER TDRR 10454 DR CHK A.G.C. APPD	23 JUN 64	KCB
C	CHANGED PER TDRR 10984 DR. CHK J.C.J APPD	29 JUL 64	

REVISIONS



STRIP .25 & TIN
108 - 29
STRIP .09 DO NOT TIN
E1
P1
CUTLINE
CUTLINE
23
22
7 - LG.63 ±.12
23
24
7 - LG.63 ±.12
A B
A B
140
21
146
229
230
21
20
6 - LG.63 ±.12
21
20
5 - LG.63 ±.12
21
20
5 - LG.63 ±.12
22
23
6 - LG.63 ±.12
E2
STRIP .25 & TIN
STRIP .25 & TIN
E2
STRIP .25 & TIN
P2
STRIP .09 DO NOT TIN
244 - 28



PART OF P1
PART OF P2
PART OF P1
BUSS BAR E2, PART OF P1
PART OF P2
E1
E2
P
BUSS BAR E2, PART OF P1

ELECTRICAL SCHEMATIC

* DENOTES LENGTH IN FEET

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-7444 TYPE I
FOR FIND NO. 8 AWG 7/16 FOR FIND NO. 14 AWG 1 1/2
FOR FIND NO. 26 AWG 5/8 FOR FIND NO. 27 AWG 3/4, FOR FIND NO. 30 1 AWG, FOR FIND NO. 31 1 1/4 AWG
~~6. ** DENOTES ATTACH FIND NO. 12 LG 5.0~~
7. QQ-B-575 FOR FIND NO. 15 BRAID SIZE 21/32, AWG 34 FOR FIND NO. 16 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 17 BRAID SIZE 3/8 AWG 34
9. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 5 SIZE NO. 7/16, FOR FIND NO. 6 SIZE NO. 1/2, FOR FIND NO. 7 SIZE NO. 5/8
~~10. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2~~
11. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
12. REMOVE CONN. HDWR SUPPLIED WITH FIND NO. 18 & REPLACE USING FIND NO. 32

C	B
B	B
A	A
—	—
SHEET 1 OF 2	SHEET 2 OF 2

REVISION STATUS OF SHEETS

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	2	MS35249-18	SCREW, FLAT HD	32
*	1.0	SEE NOTE 5	SLEEVING	31
*	1.0	SEE NOTE 5	SLEEVING	30
	108	1010738-2	CONTACT, ELEC, SOCKET	29
	244	1010738-1	CONTACT, ELEC. PIN	28
*	5.7	SEE NOTE 5	SLEEVING	27
*	5.7	SEE NOTE 5	SLEEVING	26
*	2220	1019391-11	WIRE, ELECTRICAL	25
	2	1000293-36	FERRULE, ELEC CONDUCTOR	24
	3	1000292-33	FERRULE, ELEC CONDUCTOR	23
	1	1000293-37	FERRULE, ELEC CONDUCTOR	22
	3	1000293-34	FERRULE, ELEC CONDUCTOR	21
	3	1000292-30	FERRULE, ELEC CONDUCTOR	20
	1	1006225-1	HOOD, CONNECTOR	19
	1	1006227	HOOD, CONNECTOR	18
*	5.7	SEE NOTE 7	WIRE, BRAID	17
*	120	SEE NOTE 7	WIRE, BRAID	16
*	57	SEE NOTE 7	WIRE, BRAID	15
*	5.3	SEE NOTE 5	SLEEVING	14
*	330.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	13
*	14.5	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	12
*	6.0	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	11
*	6.0	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	10
*	6.0	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	9
*	5.7	SEE NOTE 5	SLEEVING	8
*	0.2	SEE NOTE 9	SLEEVING	7
*	0.2	SEE NOTE 9	SLEEVING	6
*	0.2	SEE NOTE 9	SLEEVING	5
	2	1019472-11A	BAND MARKER, CABLE	4
	1	1019472-11	BAND MARKER, CABLE	3
	1	1010411-1	CONNECTOR	2
	1	1010691-244	CONNECTOR	1

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

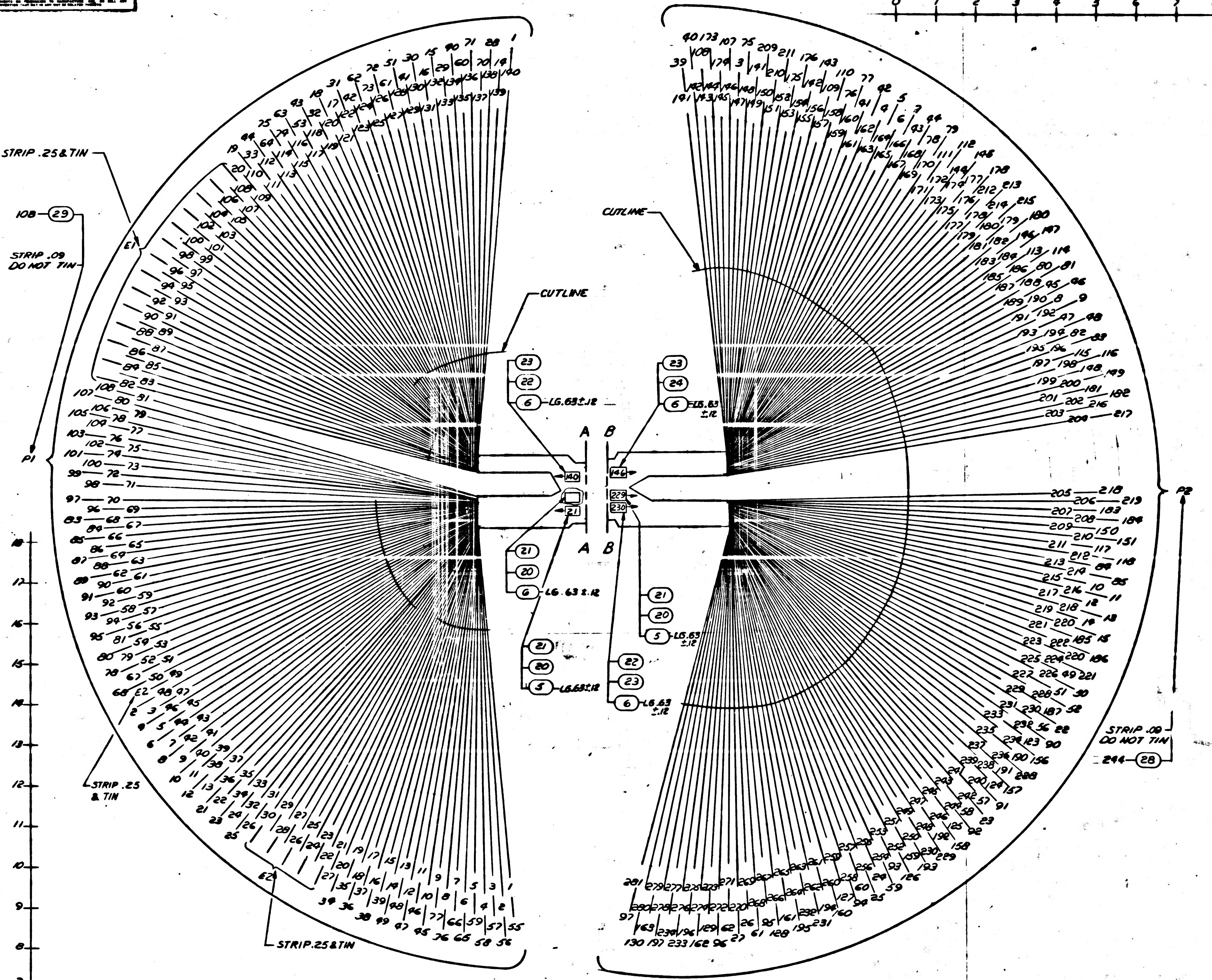
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN PJD DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

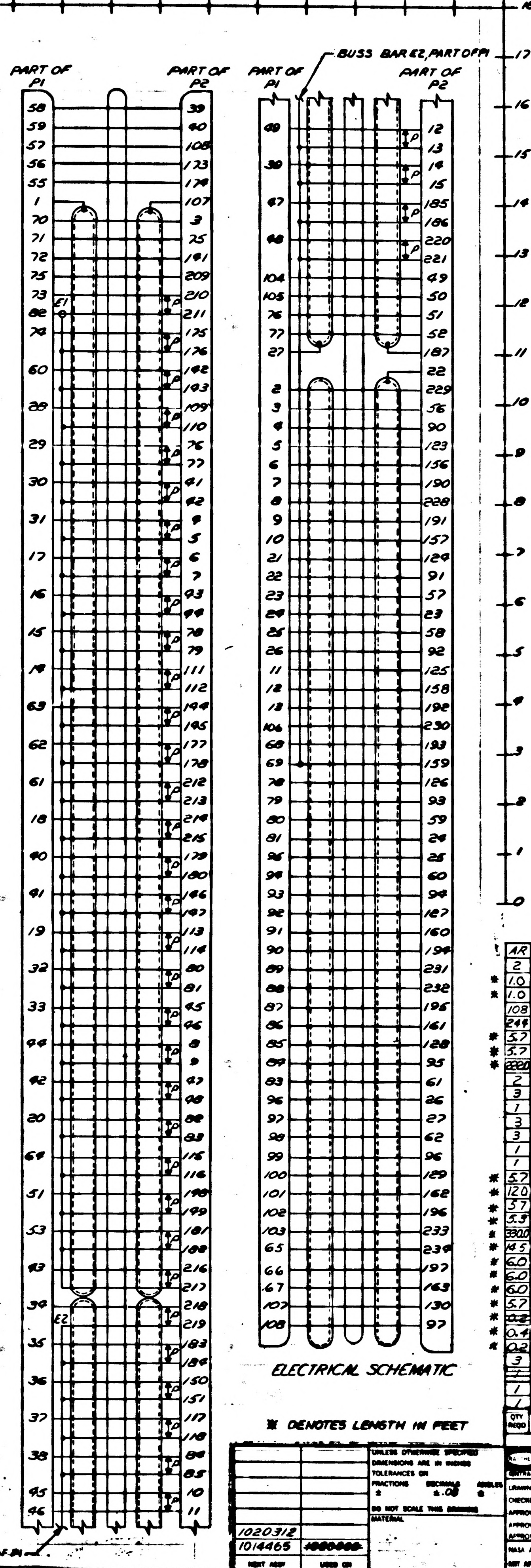
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020095
SCALE 1/1 WT SHEET 1 OF 2

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
-	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. [illegible] CHK [illegible] APPD [illegible]	APRIL 13,1964	[illegible]
B	CHANGED PER TDRR 10454 DR [illegible] CHK R.G.C. APPD [illegible]	23 JUN 64	KCB
C	CHANGED PER TDRR 10984 DR. J.J. M[illegible] CHK J.C.J APPD [illegible]	30 JUN 64	TO
D	UPGRADE TO CLASS A WITH CHANGE PER TDRR NO. 16300 DR P. [illegible] CHK [illegible] APPD [illegible]	11 MAR 65	[illegible]





ELECTRICAL SCHEMATIC

✱ DENOTES LENGTH IN FEET

NOTES

1. FOR FABRICATION SEE ND1002032
2. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING MARKING INK 1006256-001
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002023 & ND1002019 USING MARKING INK 1006256-001
4. BOND USING FIND 33 APPROX AS SHOWN
5. MIL-I-7444 TYPE I FOR FIND NO. 8 AWG 7/16 FOR FIND NO. 14 AWG 1 1/2 FOR FIND NO. 26 AWG 5/8 FOR FIND NO. 27 AWG 3/4, FOR FIND NO. 30 1AWG, FOR FIND NO. 31 1 1/8 AWG
~~6. ✱✱ DENOTES ATTACH FIND NO. 12 LG 5.0~~
7. QQ-B-575 FOR FIND NO. 15 BRAID SIZE 21/32, AWG 34 FOR FIND NO. 16 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 17 BRAID SIZE 3/8 AWG 34
9. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 5 SIZE .750 ID FOR FIND NO. 6 SIZE 1.000 ID
~~10. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2~~
11. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
12. REMOVE CONN. HDWR SUPPLIED WITH FIND NO. 18 & REPLACE USING FIND NO. 32
13. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATIONS, PREFIX WITH UNIT NUMBER OR SUB ASSEMBLY DESIGNATION(S)
14. CRIMP PER ND1002206

SHEET 1 OF 2	SHEET 2 OF 2
D	D
C	B
B	B
A	A
—	—

REVISION STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	1006253	ADHESIVE	33
	2	MS35249-18	SCREW, FLAT HD	32
✱	1.0	SEE NOTE 5	SLEEVING	31
✱	1.0	SEE NOTE 5	SLEEVING	30
	108	1010738-2	CONTACT, ELEC, SOCKET	29
	244	1010738-1	CONTACT, ELEC, PIN	28
✱	5.7	SEE NOTE 5	SLEEVING	27
✱	5.7	SEE NOTE 5	SLEEVING	26
✱	2220	1019391-11	WIRE, ELECTRICAL	25
	2	1000293-36	FERRULE, ELEC CONDUCTOR	24
	3	1000292-33	FERRULE, ELEC CONDUCTOR	23
	1	1000293-37	FERRULE, ELEC CONDUCTOR	22
	3	1000293-34	FERRULE, ELEC CONDUCTOR	21
	3	1000292-30	FERRULE, ELEC CONDUCTOR	20
	1	1006225-1	HOOD, CONNECTOR	19
	1	1006227	HOOD, CONNECTOR	18
✱	5.7	SEE NOTE 7	WIRE, BRAID	17
✱	120	SEE NOTE 7	WIRE, BRAID	16
✱	57	SEE NOTE 7	WIRE, BRAID	15
✱	5.3	SEE NOTE 5	SLEEVING	14
✱	330.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	13
✱	14.5	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	12
✱	6.0	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	11
✱	6.0	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	10
✱	6.0	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	9
✱	5.7	SEE NOTE 5	SLEEVING	8
✱	~~0.2~~	~~SEE NOTE 9~~	~~SLEEVING~~	~~7~~
✱	0.4	SEE NOTE 9	SLEEVING	6
✱	0.2	SEE NOTE 9	SLEEVING	5
	3	1019472-11A	BAND MARKER, CABLE	4
	~~1~~	~~1019472-11~~	~~BAND MARKER, CABLE~~	~~3~~
	1	1010824-1	CONNECTOR	2
	1	1010815-244	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020312	
1014465	~~1000000~~

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

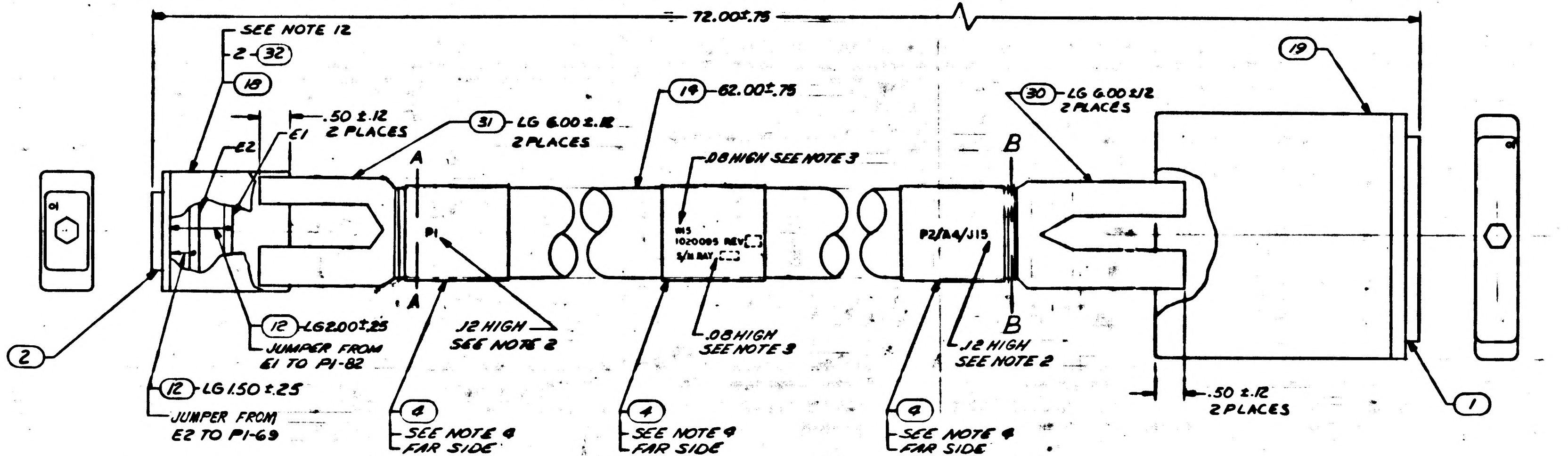
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R J D[illegible] DATE [illegible]
CHECKED [illegible] 20 Jan 64
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 3-18-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020095
SCALE 1/1
WT
SHEET 1 OF 2

SYM	DESCRIPTION	DATE	APPROVED
	REVISIONS		
—	CLASS B RELEASED PER TDRR		
A	CHANGED PER TORR 07350 DR B.Kutsuk CHK APPD	APRIL 13,1964	KCB
B	CHANGED PER TDRR 10454 DR B.Kutsuk CHK G.G.G APPD	23 JAN 64	KCB
D	UPGRADE TO CLASS A WITH CHANGE PER TDRR 16300 DR P. Wingfield CHK APPD G. Morrison	11 MAR 65	KCB


72.00±.75
SEE NOTE 12
2-32
18
E2
E1
.50 ±.12
2 PLACES
31 LG 6.00±.12
2 PLACES
A
A
P1
19 62.00±.75
.08 HIGH SEE NOTE 3
W15
1020095 REV
S/N RAY
B
B
P2/A4/J15
30 LG 6.00±.12
2 PLACES
19
2
12 LG 2.00±.25
JUMPER FROM
E1 TO P1-82
12 LG 1.50±.25
JUMPER FROM
E2 TO P1-69
.12 HIGH
SEE NOTE 2
4
SEE NOTE 4
FAR SIDE
.08 HIGH
SEE NOTE 3
4
SEE NOTE 4
FAR SIDE
4
SEE NOTE 4
FAR SIDE
.12 HIGH
SEE NOTE 2
.50 ±.12
2 PLACES
1

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	22	12	144	
	4	BLK	22	12	141	
	1	ORN	22	11	145	
	3	WHT/RED	22	9	143	
	5	BRN	22	10	142	
ATTACH FIND NO.17 & 8 LG 68.00 ±.75	77	WHT	22	13	225	
	78	WHT	22	13	226	
	8	WHT	22	13	227	
	9	WHT	22	13	228	
	10	WHT	22	25	215	
	11	BLK			216	
	13	WHT	22	25	223	
	22	BLK			224	
	12	WHT	22	25	221	
	23	BLK			222	
	20	WHT	22	25	205	
	24	BLK			206	
	19	WHT	22	25	207	
	25	BLK			208	
	18	WHT	22	25	209	
	26	BLK			210	
	17	WHT	22	25	211	
	27	BLK			212	
	16	WHT	22	25	213	
	28	BLK			214	
	15	WHT	22	25	219	
	29	BLK			220	
	14	WHT	22	25	217	
	30	BLK			218	
**	21	SHLD			229	**
ATTACH FIND NO. 16 & 28 LG 68.00±.75	31	WHT	22	13	244	
	32				243	
	33				242	
	34				241	
	35				240	
	36				239	
	37				247	
	38				246	
	39				245	
	40				238	
	41				237	
	42				236	
	43				235	
	44				234	
	45				233	
	46				232	
	47				231	
	48	WHT	22	13	248	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	79	WHT	22	13	249	
	50				250	
	49				251	
	52				252	
	53				253	
	54				254	
	55				255	
	56				256	
	57				257	
	58				258	
	59				259	
	60				260	
	61				261	
	62				262	
	63				263	
	64				264	
	65				265	
	66				266	
	67				267	
	68				268	
	69				269	
	70				270	
	71				271	
	72				272	
	73				273	
	74				274	
	75				275	
	76				276	
	6				277	
	7				278	
	51				279	
	80				280	
	81	WHT	22	13	281	
		SHLD			230	**
**	140	SHLD			146	**
ATTACH FIND NO. 16 & 27 LG 68.00±.75	137	WHT	22	13	147	
	136	WHT	22	13	148	
	126	WHT	22	13	149	
	114	WHT	22	13	150	
	139	WHT	22	25	171	
	108	BLK			172	
	138	WHT	22	25	157	
	107	BLK			158	
	135	WHT	22	25	155	
	106	BLK			156	
	134	WHT	22	25	181	
	105	BLK			182	
	133	WHT	22	25	159	
	104	BLK			160	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	132	WHT	22	25	169	
	103	BLK			170	
	131	WHT	22	25	167	
	102	BLK			168	
	130	WHT	22	25	161	
	101	BLK			162	
	129	WHT	22	25	183	
	100	BLK			184	
	128	WHT	22	25	199	
	99	BLK			200	
	127	WHT	22	25	177	
	98	BLK			178	
	125	WHT	22	25	151	
	97	BLK			152	
	124	WHT	22	25	175	
	96	BLK			176	
	123	WHT	22	25	193	
	95	BLK			194	
	122	WHT	22	25	163	
	94	BLK			164	
	121	WHT	22	25	165	
	93	BLK			166	
	120	WHT	22	25	179	
	92	BLK			180	
	119	WHT	22	25	187	
	91	BLK			188	
	118	WHT	22	25	203	
	90	BLK			204	
	117	WHT	22	25	201	
	89	BLK			202	
	116	WHT	22	25	173	
	88	BLK			174	
	115	WHT	22	25	153	
	87	BLK			154	
	113	WHT	22	25	197	
	86	BLK			198	
	112	WHT	22	25	191	
	85	BLK			192	
	111	WHT	22	25	189	
	84	BLK			190	
	110	WHT	22	25	185	
	83	BLK			186	
	109	WHT	22	25	195	
	82	BLK			196	

** DENOTES ATTACH FIND NO. 12 LG 8.00±.12

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.O.D. DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-65
MIT APPROVAL
MIT APPROVAL 2-11-65

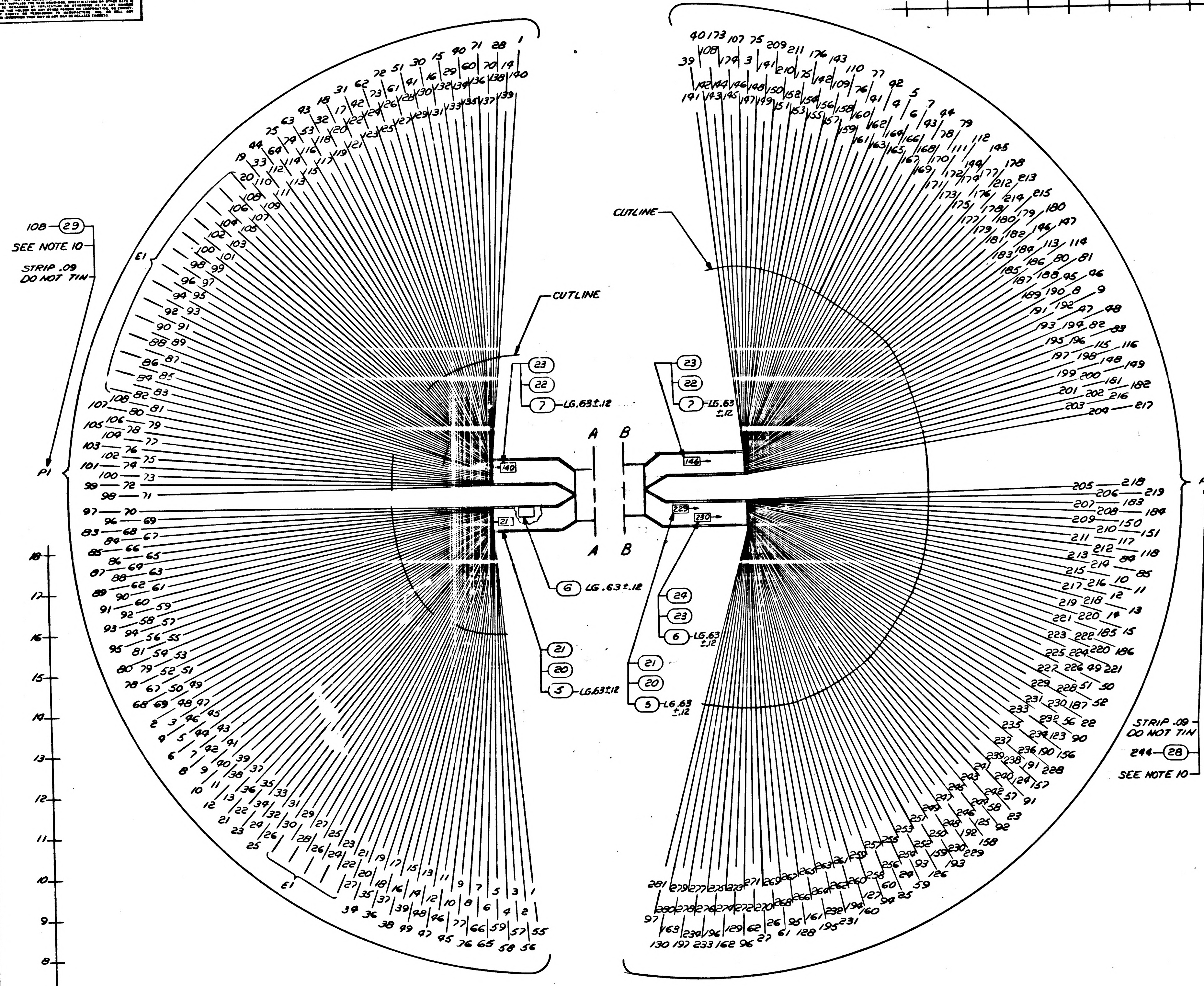
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

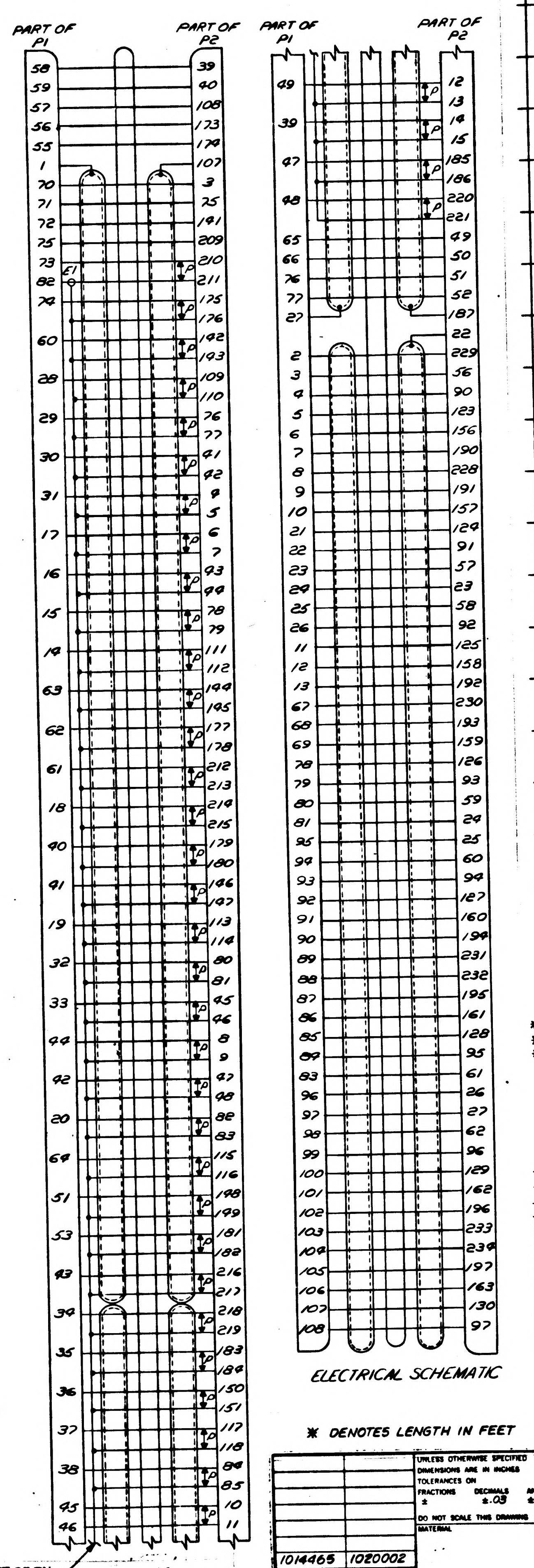
CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020095
SCALE 1/1
WT
SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASED PER TDRR		





ELECTRICAL SCHEMATIC

✱ DENOTES LENGTH IN FEET

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. MARK .12 HIGH BLK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO. 3 AND 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2, GRADE A, CLASS 1, CATEGORY 1 FOR FIND NO. 8 AWG 7/16 FOR FIND NO. 14 AWG 1 1/2 FOR FIND NO. 26 AWG 5/8 FOR FIND NO. 27 AWG 3/4
6. ✱✱ DENOTES ATTACH FIND NO. 12 LG 5.0
7. QQ-B-575 FOR FIND NO. 15 BRAID SIZE 21/32, AWG 30, FOR FIND NO. 16 BRAID SIZE 1/2, AWG 34, FOR FIND NO. 17 BRAID SIZE 3/8 AWG 34
9. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 5 SIZE NO. 7/16, FOR FIND NO. 6 SIZE NO. 1/2, FOR FIND NO. 7 SIZE NO. 5/8
10. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1 & 2
11. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	108	1010738-2	CONTACT, ELEC, SOCKET	29
	244	1010738-1	CONTACT, ELEC. PIN	28
✱	5.7	SEE NOTE 5	SLEEVING	27
✱	5.7	SEE NOTE 5	SLEEVING	26
✱	222.0	1019341-11	WIRE, ELECTRICAL	25
	1	1000293-36	FERRULE, ELEC CONDUCTOR	24
	3	1000292-33	FERRULE, ELEC CONDUCTOR	23
	2	1000292-39	FERRULE, ELEC CONDUCTOR	22
	2	1000293-34	FERRULE, ELEC CONDUCTOR	21
	2	1000292-30	FERRULE, ELEC CONDUCTOR	20
	1	1006225-1	HOOD, CONNECTOR	19
	1	1006227	HOOD, CONNECTOR	18
✱	5.7	SEE NOTE 7	WIRE, BRAID	17
✱	5.7	SEE NOTE 7	WIRE, BRAID	16
✱	5.7	SEE NOTE 7	WIRE, BRAID	15
✱	5.3	SEE NOTE 5	SLEEVING	14
✱	330.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	13
✱	13.2	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	12
✱	6.0	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	11
✱	6.0	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	10
✱	6.0	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	9
✱	5.7	SEE NOTE 5	SLEEVING	8
✱	0.2	SEE NOTE 9	SLEEVING	7
✱	0.2	SEE NOTE 9	SLEEVING	6
✱	0.2	SEE NOTE 9	SLEEVING	5
	2	1019472-9A	BAND MARKER, CABLE	4
	1	1019472-9	BAND MARKER, CABLE	3
	1	1010411-1	CONNECTOR	2
	1	1010691-2	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R J D
CHECKED 20 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 1-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

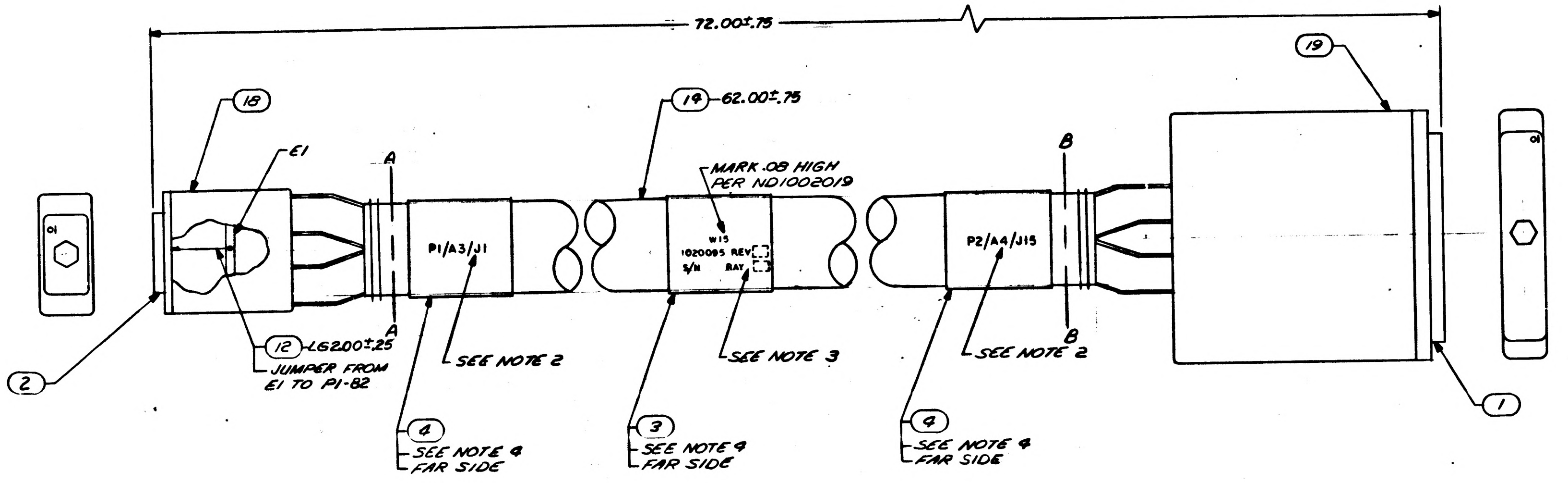
CODE IDENT NO —— SIZE J NASA DRAWING NO 1020095
SCALE 1/1 WT SHEET 1 OF 2

BLUEPRINT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

1020095

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		



ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	2	BLK	22	12	144	
	4	BLK	22	12	141	
	1	ORN	22	11	145	
	3	WHT/RED	22	9	143	
	5	BRN	22	10	142	
ATTACH FIND NO.17 & 8 LG68.00±.75	6	WHT	22	13	225	
	7	WHT	22	13	226	
	8	WHT	22	13	227	
	9	WHT	22	13	228	
	10	WHT	22	25	215	
	11	BLK			216	
	13	WHT	22	25	223	
	22	BLK			224	
	12	WHT	22	25	221	
	23	BLK			222	
	20	WHT	22	25	205	
	24	BLK			206	
	19	WHT	22	25	207	
	25	BLK			208	
	18	WHT	22	25	209	
	26	BLK			210	
	17	WHT	22	25	211	
	27	BLK			212	
	16	WHT	22	25	213	
	28	BLK			214	
	15	WHT	22	25	219	
	29	BLK			220	
	14	WHT	22	25	217	
	30	BLK			218	
**	21	SHLD			229	**
ATTACH FIND NO.16 & 26 LG68.00±.75	31	WHT	22	13	244	
	32				243	
	33				242	
	34				241	
	35				240	
	36				239	
	37				247	
	38				246	
	39				245	
	40				238	
	41				237	
	42				236	
	43				235	
	44				234	
	45				233	
	46				232	
	47				231	
	48	WHT	22	13	248	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	51	WHT	22	13	249	
	50				250	
	49				251	
	52				252	
	53				253	
	54				254	
	55				255	
	56				256	
	57				257	
	58				258	
	59				259	
	60				260	
	61				261	
	62				262	
	63				263	
	64				264	
	65				265	
	66				266	
	67				267	
	68				268	
	69				269	
	70				270	
	71				271	
	72				272	
	73				273	
	74				274	
	75				275	
	76				276	
	77				277	
	78				278	
	79				279	
	80				280	
	81	WHT	22	13	281	
**		SHLD			230	**
**	140	SHLD			146	**
ATTACH FIND NO. 15 & 27 LG68.00±.75	137	WHT	22	13	147	
	136	WHT	22	13	148	
	126	WHT	22	13	149	
	114	WHT	22	13	150	
	1[illegible]9	WHT	22	25	171	
	108	BLK			172	
	138	WHT	22	25	157	
	107	BLK			158	
	135	WHT	22	25	155	
	106	BLK			156	
	139	WHT	22	25	181	
	105	BLK			182	
	133	WHT	22	25	159	
	104	BLK			160	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	132	WHT	22	25	169	
	103	BLK			170	
	131	WHT	22	25	167	
	102	BLK			168	
	130	WHT	22	25	161	
	101	BLK			162	
	129	WHT	22	25	183	
	100	BLK			184	
	128	WHT	22	25	199	
	99	BLK			200	
	127	WHT	22	25	177	
	98	BLK			178	
	125	WHT	22	25	151	
	97	BLK			152	
	124	WHT	22	25	175	
	96	BLK			176	
	123	WHT	22	25	193	
	95	BLK			194	
	122	WHT	22	25	163	
	94	BLK			164	
	121	WHT	22	25	165	
	93	BLK			166	
	120	WHT	22	25	179	
	92	BLK			180	
	119	WHT	22	25	187	
	91	BLK			188	
	118	WHT	22	25	203	
	90	BLK			204	
	117	WHT	22	25	201	
	89	BLK			202	
	116	WHT	22	25	173	
	88	BLK			174	
	115	WHT	22	25	153	
	87	BLK			154	
	113	WHT	22	25	197	
	86	BLK			198	
	112	WHT	22	25	191	
	85	BLK			192	
	111	WHT	22	25	189	
	84	BLK			190	
	110	WHT	22	25	185	
	83	BLK			186	
	109	WHT	22	25	195	
	82	BLK			196	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN RJD DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL 11 Feb 64
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W15
AGC/CTS OPERATION CONSOLE

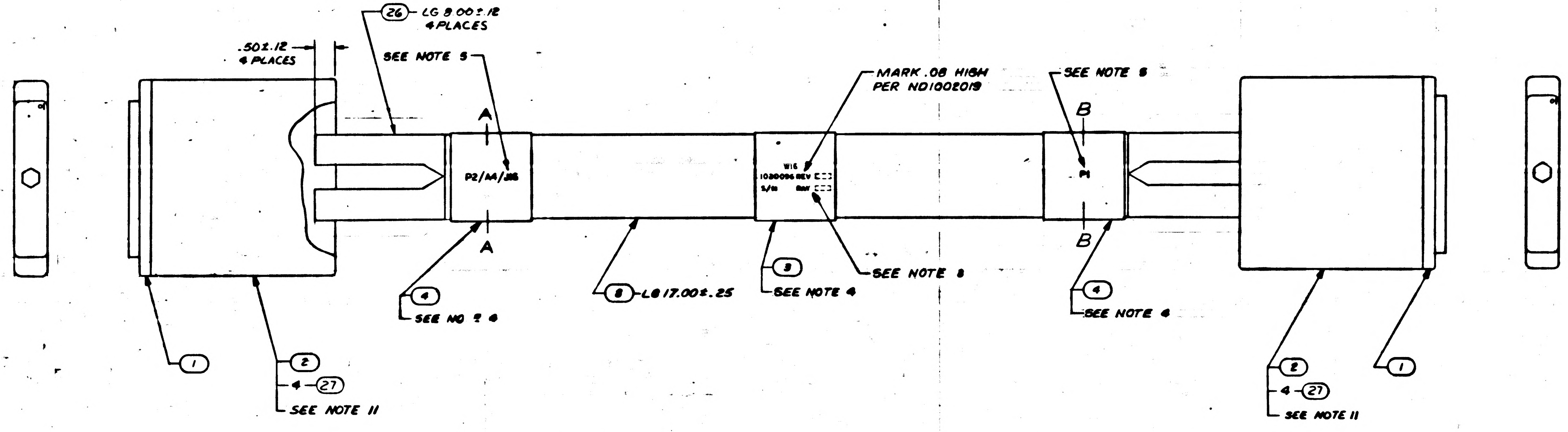
CODE IDENT NO —— SIZE J NASA DRAWING NO 1020095
SCALE 1/1 WT SHEET 2 OF 2

1020095

1020095

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 10454 DR [illegible] CHK Q.G.C. APPD [illegible]	22 [illegible] 68	KCO



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/69

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	8	MS 35249-18	SCREW, FLAT HD	27
	AR	SEE NOTE 2	SLEEVING	26
	4	1000243-34	FERRULE, ELEC. COND	25
	4	1000242-30	FERRULE, ELEC. COND	24
✱	3.0	SEE NOTE 2	SLEEVING	23
✱	3.0	SEE NOTE 6	WIRE, BRAID	22
✱	0.2	SEE NOTE 7	INSULATION, SLEEVING	21
	2	1000242-35	FERRULE, ELEC COND	20
	2	1000243-38	FERRULE, ELEC COND	19
	488	1010738-1	CONTACT, ELEC, PIN	18
✱	0.5	SEE NOTE 7	INSULATION, SLEEVING	17
	2	1000243-36	FERRULE, ELEC. COND	16
✱	0.5	SEE NOTE 7	INSULATION, SLEEVING	15
	2	1000242-34	FERRULE, ELEC. COND	14
	4	1000243-41	FERRULE, ELEC. COND	13
✱	3.0	SEE NOTE 6	WIRE, BRAID	12
✱	3.0	SEE NOTE 6	WIRE, BRAID	11
✱	1.5	SEE NOTE 2	SLEEVING	10
✱	3.0	SEE NOTE 2.	SLEEVING	9
✱	1.5	SEE NOTE 2	SLEEVING	8
✱	2825	1014341-11	WIRE, ELEC	7
✱	40.0	MIL-W-16878/4, E22 WHT	WIRE, ELEC	6
✱	14.0	MIL-W-16878/4, E22, BLK	WIRE, ELEC	5
	2	1014472-13A	BAND MARKER, CABLE	4
	1	1014472-13	BAND MARKER, CABLE	3
	2	1006225-1	HOOD, CONNECTOR	2
	2	1010641-244	CONNECTOR	1

LIST OF MATERIALS

✱ DENOTES LENGTH IN FEET

A	A	A	A
—	—	—	—
SH 1	SH 2	SH 3	SH 4

REV STATUS OF SHEETS

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE A CLASS I CATEGORY I FOR FIND NO. 8 AWG 1 3/4
FOR FIND NO. 9 AWG 3/4 FOR FIND NO. 10 5/8 AWG, FOR FIND NO. 23 1/2 AWG, FOR FIND NO. 26 1 [illegible] AWG
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .12 HIGH PER ND1002019
6. QQ-B-575 FOR FIND NO. 11 BRAID SIZE 1/2 AWG 34
FOR FIND NO. 12 BRAID SIZE 21/32 AWG 34 FOR FIND NO. 22 3/8 AWG 34
7. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 15
SIZE NO. 5/8 FOR FIND NO. 17 SIZE NO. 1/2, FOR FIND NO. 21 SIZE 7/8
~~8. [illegible] DENOTES ATTACH FIND NO. 5, LG 6.00~~
~~9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1~~
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
11. REMOVE CONNECTOR HARDWARE SUPPLIED WITH FIND NO. 2 AND REPLACE USING FIND NO. 27

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGULAR ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO
LEXINGTON, MASS
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W16
AGC/CTS OPERATION CONSOLE

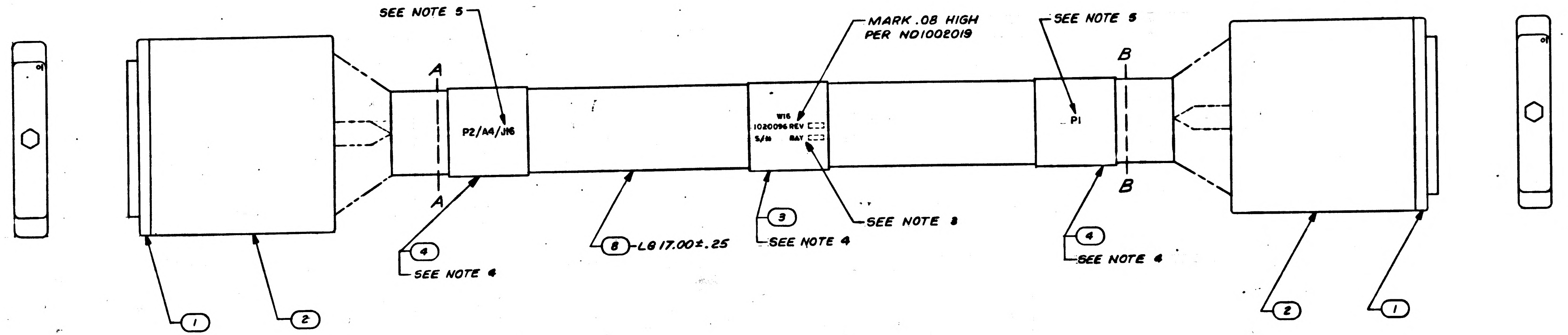
CODE IDENT NO. —— SIZE J NASA DRAWING NO 1020096
SCALE [illegible] WT SHEET 1 OF 4

MASTER

1020096

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

—	—	—	—
SH 1	SH 2	SH 3	SH 4
REV STATUS OF SHEETS			

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U, GRADE A CLASS I CATEGORY I FOR FIND NO. 8 AWG 1 3/4 FOR FIND NO. 9 AWG 3/4 FOR FIND NO. 10 5/8 AWG
3. MARK .08 HIGH PER ND 1002023
4. BOND FIND NO. 3 AND 4 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MARK .12 HIGH PER ND1002019
6. QQ-B-575 FOR FIND NO. 11 BRAID SIZE 1/2 AWG 34 FOR FIND NO. 12 BRAID SIZE 21/32 AWG 30
7. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 15 SIZE NO. 5/8 FOR FIND NO. 17 SIZE NO. 1/2, FOR FIND NO. 21 SIZE 7/8
8. ✱✱ DENOTES ATTACH FIND NO. 5, LG 6.00
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

✱ DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
✱	0.2	SEE NOTE 7	INSULATION, SLEEVING	21
	2	1000242-35	FERRULE, ELEC COND	20
	2	1000243-38	FERRULE, ELEC COND	19
	488	1010738-1	CONTACT, ELEC, PIN	18
✱	0.5	SEE NOTE 7	INSULATION, SLEEVING	17
	4	1000243-36	FERRULE, ELEC. COND	16
✱	0.5	SEE NOTE 7	INSULATION, SLEEVING	15
	4	1000242-34	FERRULE, ELEC. COND	14
	8	1000242-33	FERRULE, ELEC. COND	13
✱	4.5	SEE NOTE 6	WIRE, BRAID	12
✱	4.5	SEE NOTE 6	WIRE, BRAID	11
✱	4.5	SEE NOTE 2	SLEEVING	10
✱	4.5	SEE NOTE 2	SLEEVING	9
✱	1.5	SEE NOTE 2	SLEEVING	8
✱	2825	1014341-11	WIRE, ELEC	7
✱	40.8	MIL-W-16878/4, E22, WHT	WIRE, ELEC	6
✱	11.0	MIL-W-16878/4, E22, BLK	WIRE, ELEC	5
	2	1014472-13A	BAND MARKER, CABLE	4
	1	1014472-13	BAND MARKER, CABLE	3
	2	1006225-1	HOOD, CONNECTOR	2
	2	1010641-2	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED A. Casgrain
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

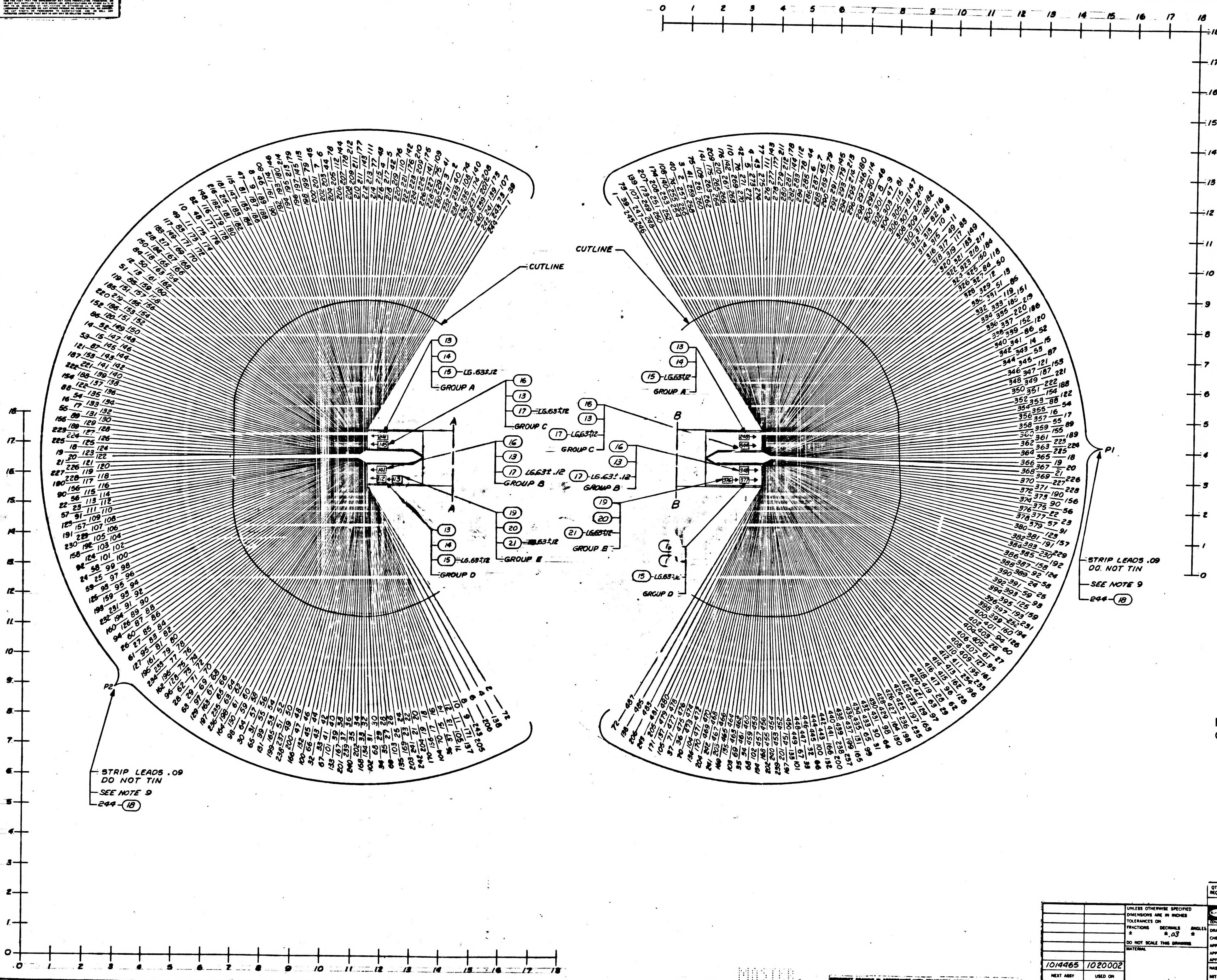
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W16
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020096
SCALE 1/1
WT
SHEET 1 OF 4

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	CL B RELEASED PER TDRR		


CUTLINE
CUTLINE
13
14
15 LG.63±.12
GROUP A
16
13
17 LG.63±.12
GROUP C
16
13
17 LG.63±.12
GROUP B
19
20
21 LG.63±.12
GROUP E
13
14
15 LG.63±.12
GROUP D
A
A
B
B
P1
P2
STRIP LEADS .09
DO NOT TIN
SEE NOTE 9
244 18
STRIP LEADS .09
DO NOT TIN
SEE NOTE 9
244 18
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
		LIST OF MATERIALS	

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN W. Carlson DATE
CHECKED A. Caggiano
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

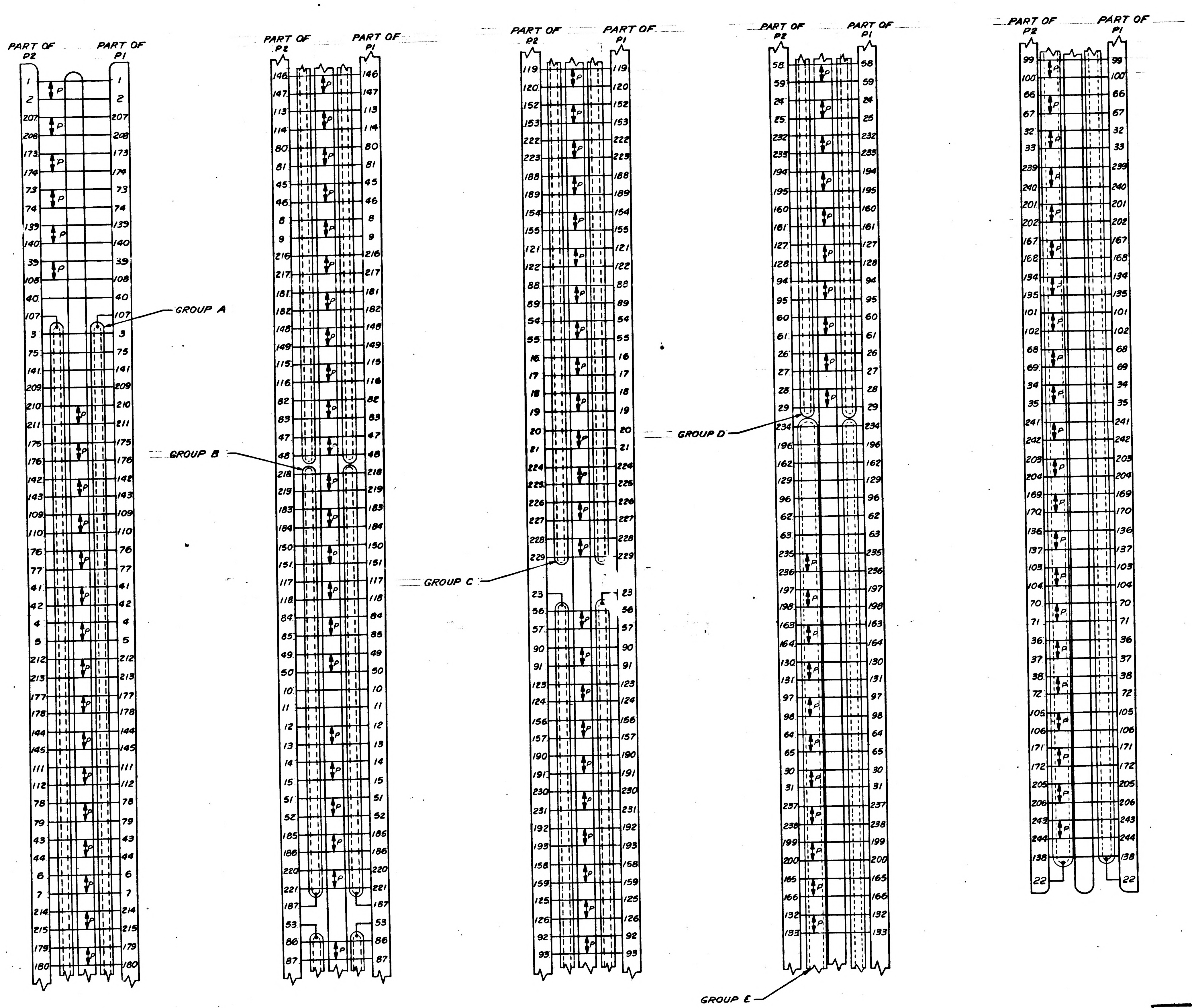
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W16
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020096
SCALE 1/1 WT SHEET 2 OF 4

DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF P2
PART OF P1
1 2 207 208 173 174 73 74 139 140 39 108 40 107 3 75 141 209 210 211 175 176 142 143 109 110 76 77 41 42 4 5 212 213 177 178 144 145 111 112 78 79 43 44 6 7 214 215 179 180
GROUP A
P
146 147 113 114 80 81 45 46 8 9 216 217 181 182 148 149 115 116 82 83 47 48 218 219 183 184 150 151 117 118 84 85 49 50 10 11 12 13 14 15 51 52 185 186 220 221 187 53 86 87
GROUP B
119 120 152 153 222 223 188 189 154 155 121 122 88 89 54 55 16 17 18 19 20 21 224 225 226 227 228 229 23 56 57 90 91 123 124 156 157 190 191 230 231 192 193 158 159 125 126 92 93
GROUP C
58 59 24 25 232 233 194 195 160 161 127 128 94 95 60 61 26 27 28 29 234 196 162 129 96 62 63 235 236 197 198 163 164 130 131 97 98 64 65 30 31 237 238 199 200 165 166 132 133
GROUP D
GROUP E
99 100 66 67 32 33 239 240 201 202 167 168 134 135 101 102 68 69 34 35 241 242 203 204 169 170 136 137 103 104 70 71 36 37 38 72 105 106 171 172 205 206 243 244 138 22

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4-18

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W16
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020096
SCALE NONE WT SHEET 3 OF 4

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY DESIGNATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	244	WHT	22	7	245	
	231	BLK			258	
	238	WHT	22	7	251	
	237	BLK			252	
	234	WHT	22	7	255	
	243	BLK			246	
	242	WHT	22	7	247	
	233	BLK			256	
	240	WHT	22	7	249	
	235	BLK			254	
	236	WHT	22	7	253	
	239	BLK			250	
	232	WHT	22	6	257	
	230	WHT	22	6	259	GROUP A ATTACH FIND NO.12 AND 9 LG 24.00±.50
	228	WHT	22	6	261	
	226	WHT	22	6	263	
	224	WHT	22	6	265	
	223	WHT	22	7	266	
	210	BLK			279	
	225	WHT	22	7	264	
	222	BLK			267	
	221	WHT	22	7	268	
	212	BLK			277	
	227	WHT	22	7	262	
	220	BLK			269	
	219	WHT	22	7	270	
	214	BLK			275	
	229	WHT	22	7	260	
	218	BLK			271	
	216	WHT	22	7	273	
	217	BLK			272	
	209	WHT	22	7	280	
	196	BLK			293	
	211	WHT	22	7	278	
	208	BLK			281	
	207	WHT	22	7	282	
	198	BLK			291	
	213	WHT	22	7	276	
	206	BLK			283	
	205	WHT	22	7	284	
	200	BLK			289	
	215	WHT	22	7	274	
	204	BLK			285	
	203	WHT	22	7	286	
	202	BLK			287	
	195	WHT	22	7	294	
	182	BLK			307	
	197	WHT	22	7	292	
	194	BLK			295	
	193	WHT	22	7	296	
	184	BLK			305	
	199	WHT	22	7	290	
	192	BLK			297	
	191	WHT	22	7	298	
	186	BLK			303	
	201	WHT	22	7	288	
	190	BLK			299	
	189	WHT	22	7	300	
	188	BLK			301	
	181	WHT	22	7	308	
	168	BLK			321	
	183	WHT	22	7	306	
	180	BLK			309	
	179	WHT	22	7	310	
	170	BLK			319	
	185	WHT	22	7	304	
	178	BLK			311	
	177	WHT	22	7	312	
	172	BLK			317	
	187	WHT	22	7	302	
	176	BLK			313	
**	241	SHIELD			248	**
	167	WHT	22	7	322	GROUP B ATTACH FIND NO. 11 AND 10 LG 24.00±.50
	154	BLK			335	
	169	WHT	22	7	320	
	166	BLK			323	
	165	WHT	22	7	324	
	156	BLK			333	
	171	WHT	22	7	318	
	164	BLK			325	
	163	WHT	22	7	326	
	158	BLK			331	

ASSEMBLY DESIGNATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	173	WHT	22	7	316	
	162	BLK			327	
	175	WHT	22	6	314	
	174	WHT	22	6	315	
	161	WHT	22	7	328	
	160	BLK			329	
	147	WHT	22	7	342	
	146	BLK			343	
	159	WHT	22	7	330	
	148	BLK			341	
	155	WHT	22	7	334	
	152	BLK			337	
	153	WHT	22	7	336	
	140	BLK			349	
**	141	SHIELD			348	**
	149	WHT	22	7	340	GROUP C ATTACH FIND NO. 11 AND 10 LG 24.00±.50
	144	BLK			345	
	157	WHT	22	7	332	
	150	BLK			339	
	151	WHT	22	7	338	
	142	BLK			347	
	139	WHT	22	7	350	
	127	BLK			362	
	138	WHT	22	7	351	
	128	BLK			361	
	137	WHT	22	7	352	
	129	BLK			360	
	143	WHT	22	7	346	
	136	BLK			353	
	135	WHT	22	7	354	
	130	BLK			359	
	134	WHT	22	7	355	
	131	BLK			358	
	133	WHT	22	7	356	
	132	BLK			357	
	124	WHT	22	7	365	
	123	BLK			366	
	122	WHT	22	7	367	
	121	BLK			368	
	126	WHT	22	7	363	
	125	BLK			364	
	120	WHT	22	7	369	
	119	BLK			370	
	118	WHT	22	7	371	
	106	BLK			383	
**	145	SHIELD			344	**
	114	WHT	22	7	375	GROUP D ATTACH FIND NO. 12 AND 9 LG 24.00±.50
	111	BLK			378	
	115	WHT	22	7	374	
	110	BLK			379	
	109	WHT	22	7	380	
	102	BLK			387	
	116	WHT	22	7	373	
	108	BLK			381	
	117	WHT	22	7	372	
	107	BLK			382	
	105	WHT	22	7	384	
	92	BLK			397	
	104	WHT	22	7	385	
	93	BLK			396	
	103	WHT	22	7	386	
	94	BLK			395	
	95	WHT	22	7	394	
	88	BLK			401	
	101	WHT	22	7	388	
	96	BLK			393	
	100	WHT	22	7	389	
	97	BLK			392	
	99	WHT	22	7	390	
	98	BLK			391	
	91	WHT	22	7	398	
	78	BLK			411	
	90	WHT	22	7	399	
	79	BLK			410	
	89	WHT	22	7	400	
	80	BLK			409	
	81	WHT	22	7	408	
	74	BLK			415	
	87	WHT	22	7	402	
	82	BLK			407	

ASSEMBLY DESIGNATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	86	WHT	22	7	403	
	83	BLK			406	
	85	WHT	22	7	404	
	84	BLK			405	
	71	WHT	22	7	418	
	70	BLK			419	
**	112	SHIELD			377	**
	77	WHT	22	6	412	GROUP E ATTACH FIND NO.12 AND 9 LG 24.00±.50
	76	WHT	22	6	413	
	75	WHT	22	6	414	
	67	WHT	22	6	422	
	73	WHT	22	6	416	
	72	WHT	22	6	417	
	69	WHT	22	6	420	
	64	WHT	22	7	425	
	63	BLK			426	
	65	WHT	22	7	424	
	62	BLK			427	
	66	WHT	22	7	423	
	61	BLK			428	
	60	WHT	22	7	429	
	53	BLK			436	
	68	WHT	22	7	421	
	59	BLK			430	
	58	WHT	22	7	431	
	55	BLK			434	
	57	WHT	22	7	432	
	56	BLK			433	
	50	WHT	22	7	439	
	49	BLK			440	
	51	WHT	22	7	438	
	48	BLK			441	
	52	WHT	22	7	437	
	47	BLK			442	
	46	WHT	22	7	443	
	39	BLK			450	
	54	WHT	22	7	435	
	45	BLK			444	
	44	WHT	22	7	445	
	41	BLK			448	
	43	WHT	22	7	446	
	42	BLK			447	
	36	WHT	22	7	453	
	35	BLK			454	
	37	WHT	22	7	452	
	34	BLK			455	
	38	WHT	22	7	451	
	33	BLK			456	
	32	WHT	22	7	457	
	25	BLK			464	
	40	WHT	22	7	449	
	31	BLK			458	
	30	WHT	22	7	459	
	27	BLK			462	
	29	WHT	22	7	460	
	28	BLK			461	
	22	WHT	22	7	467	
	21	BLK			468	
	23	WHT	22	7	466	
	20	BLK			469	
	24	WHT	22	7	465	
	19	BLK			470	
	18	WHT	22	7	471	
	11	BLK			478	
	26	WHT	22	7	463	
	17	BLK			472	
	16	WHT	22	7	473	
	13	BLK			476	
	15	WHT	22	7	474	
	14	BLK			475	
	2	WHT	22	6	487	
	12	WHT	22	6	477	
	10	WHT	22	6	479	
	9	WHT	22	7	480	
	6	BLK			483	
	8	WHT	22	6	481	
	4	BLK	22	5	485	
**	113	SHLD			376	**

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

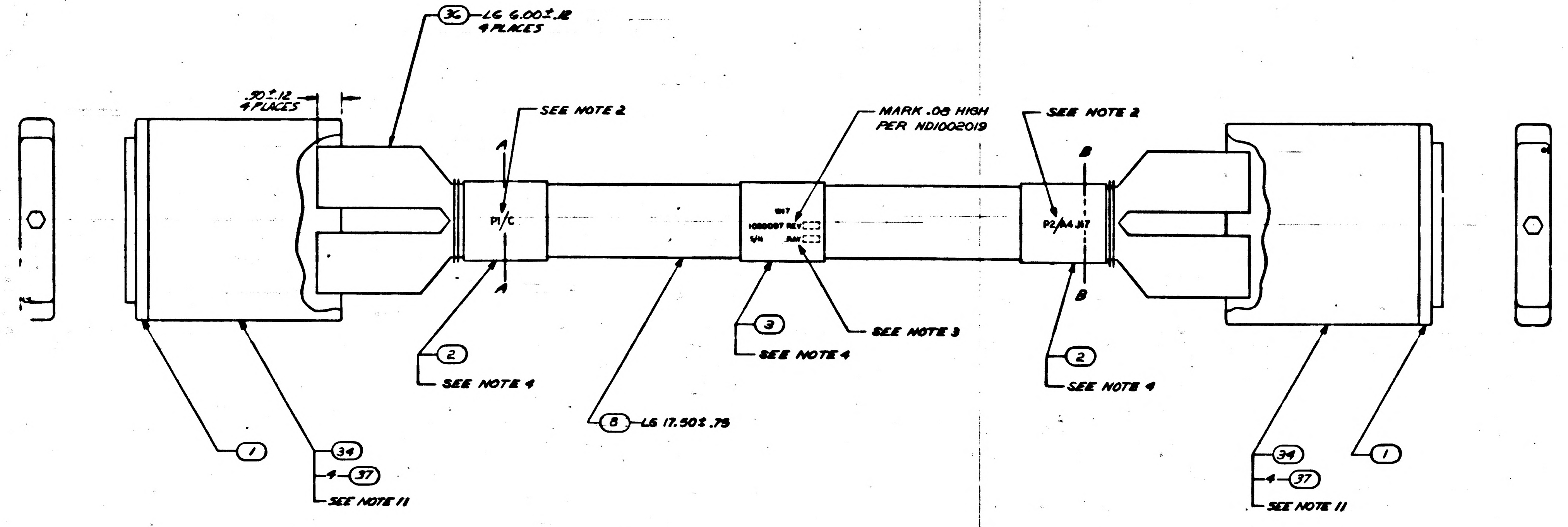
CABLE ASSEMBLY
W16
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020096
SCALE NONE WT SHEET 4 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-0327

1020096

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 10450 DR. Ken Bull CHK J.C. APPD	24 Jun 64	KB



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06368 DATE 11 Feb 64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U, GRADE A, CLASS I CATEGORY I FOR FIND NO. 4 SIZE NO. 3, FOR FIND NO. 5 AWG 7/16, FOR FIND NO. 6 AWG 5/8, FOR FIND NO. 7 AWG 3/4, FOR FIND NO. 8 AWG 1 1/2, FOR FIND NO. 36 AWG 1 1/4
6. MIL-I-23053 CLASS I COLOR BLACK FOR FIND NO. 9 SIZE NO. 2, FOR FIND NO. 10 SIZE NO. 7/16, FOR FIND NO. 11 SIZE NO. 1/2, FOR FIND NO. 12 SIZE NO. 5/8, FOR FIND NO. 13 SIZE NO. 7/8
7. QQ-B-575 FOR FIND NO. 14 BRAID SIZE 13/64 AWG 34, FOR FIND NO. 15 BRAID SIZE 3/8 AWG 34, FOR FIND NO. 16 BRAID SIZE 1/2 AWG 34, FOR FIND NO. 18 BRAID SIZE 21/32 AWG 34
~~8. [illegible]~~
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY
11. REMOVE CLAMPING HDWR. SUPPLIED WITH FIND NO. 34 & REPLACE USING FIND NO 37

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	8	MS35249-18	SCREW, FLAT HD	37
*	2.0	SEE NOTE 5	SLEEVING	36
	488	1010738-1	CONTACT, ELEC, PIN	35
	2	1006225-1	HOOD, CONNECTOR	34
	2	1000243-38	FERRULE, ELEC CONDUCTOR	33
	2	1000242-35	FERRULE, ELEC CONDUCTOR	32
	6	1000243-36	FERRULE, ELEC CONDUCTOR	31
	2	1000243-34	FERRULE, ELEC CONDUCTOR	30
	2	1000243-20	FERRULE, ELEC CONDUCTOR	29
	~~[illegible]~~	~~[illegible]~~	~~FERRULE, ELEC CONDUCTOR~~	~~[illegible]~~
	6	1000242-33	FERRULE, ELEC CONDUCTOR	27
	2	1000242-30	FERRULE, ELEC CONDUCTOP	26
	2	1000242-22	FERRULE, ELEC CONDUCTOR	25
*	245	1014341-11	WIRE, ELECTRICAL	24
*	2.7	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	23
*	2.7	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	22
*	2.7	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	21
*	15.4	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	20
*	78.9	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	19
*	2.0	SEE NOTE 7	WIRE, BRAID	18
~~*~~	~~[illegible]~~	~~SEE NOTE 7~~	~~WIRE, BRAID~~	~~17~~
*	2.0	SEE NOTE 7	WIRE, BRAID	16
*	6.0	SEE NOTE 7	WIRE, BRAID	15
*	2.0	SEE NOTE 7	WIRE, BRAID	14
*	0.2	SEE NOTE 6	SLEEVING	13
*	0.2	SEE NOTE 6	SLEEVING	12
*	0.3	SEE NOTE 6	SLEEVING	11
*	0.2	SEE NOTE 6	SLEEVING	10
*	0.2	SEE NOTE 6	SLEEVING	9
*	1.7	SEE NOTE 5	SLEEVING	8
*	2.0	SEE NOTE 5	SLEEVING	7
*	6.0	SEE NOTE 5	SLEEVING	6
*	2.0	SEE NOTE 5	SLEEVING	5
*	2.0	SEE NOTE 5	SLEEVING	4
	1	1014472-12	BAND MARKER, CABLE	3
	2	1014472-12A	BAND MARKER, CABLE	2
	2	1010641-44	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

A	A	A	—
SH 1	SH 2	SH 3	SH 4

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-[illegible]
DRAWN R.S. Dugg DATE [illegible]
CHECKED A. G. [illegible] 21 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

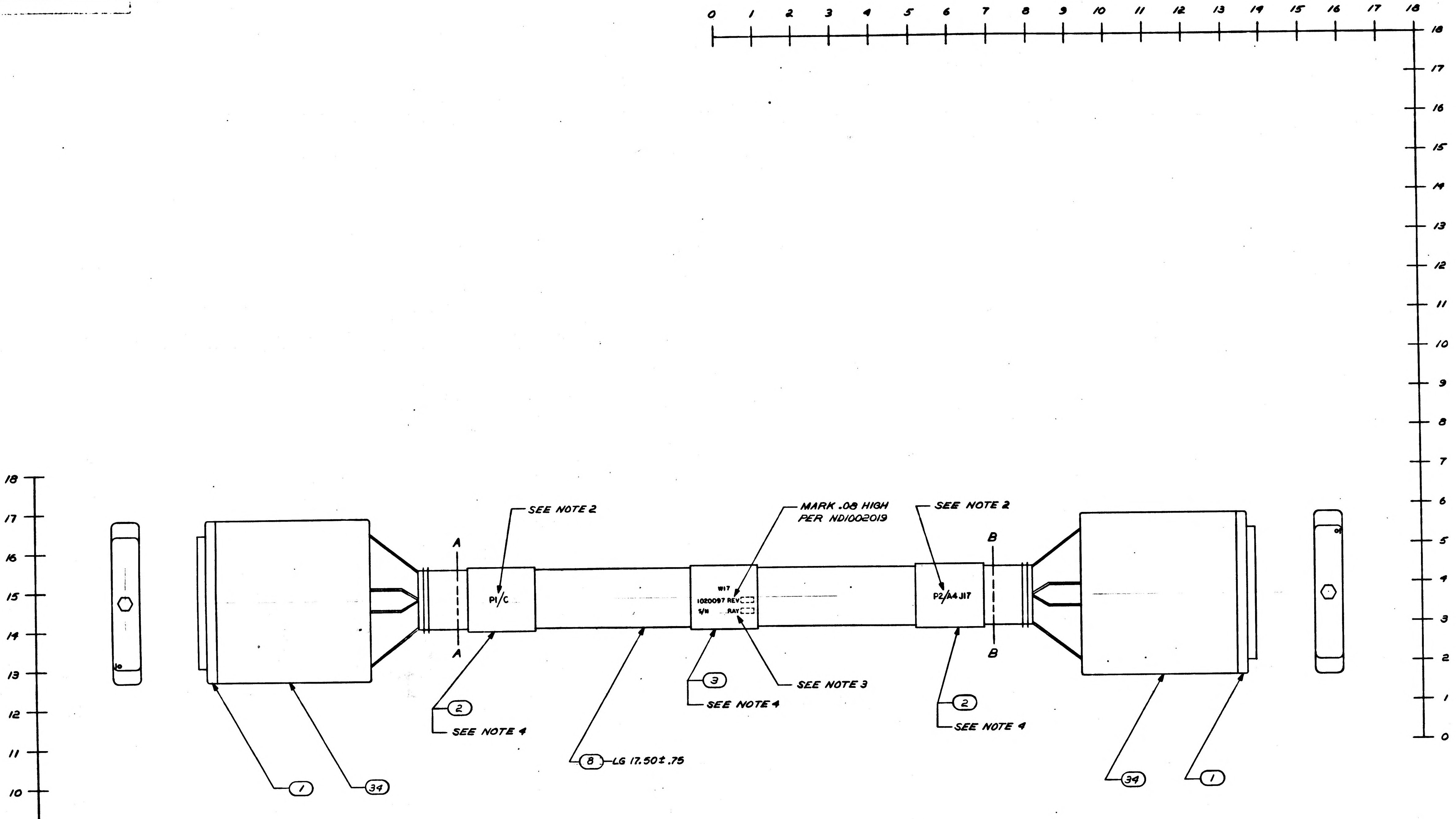
CABLE ASSEMBLY
W17
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO 1020097
SCALE 1/1 WT SHEET 1 OF 4

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06368 DATE 11 Feb 64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO. 2 AND 3 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U2 GRADE a, CLASS I CATEGORY I FOR FIND NO. 4 SIZE NO. 3, FOR FIND NO. 5 AWG 7/16, FOR FIND NO. 6 AWG 5/8, FOR FIND NO. 7 AWG 3/4, FOR FIND NO. 8 AWG 1 1/2
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 9 SIZE NO. 2, FOR FIND NO. 10 SIZE NO. 7/16, FOR FIND NO. 11 SIZE NO. 1/2, FOR FIND NO. 12 SIZE NO. 5/8, FOR FIND NO. 13 SIZE NO. 7/8
7. QQ-B-575 FOR FIND NO. 14 BRAID SIZE 13/64 AWG 34, FOR FIND NO. 15 BRAID SIZE 3/8 AWG 34, FOR FIND NO. 16 BRAID SIZE 1/2 AWG 34, FOR FIND NO. 17 BRAID SIZE 9/16 AWG 30, FOR FIND NO. 18 BRAID SIZE 21/32 AWG 30
8. ✱✱ ATTACH FIND NO. 20 LG 4.50±.12
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
10. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	488	1010738-1	CONTACT, ELEC, PIN	35
	2	1006225-1	HOOD, CONNECTOR	34
	2	1000243-38	FERRULE, ELEC CONDUCTOR	33
	2	1000242-35	FERRULE, ELEC CONDUCTOR	32
	2	1000243-36	FERRULE, ELEC CONDUCTOR	31
	2	1000243-34	FERRULE, ELEC CONDUCTOR	30
	2	1000243-20	FERRULE, ELEC CONDUCTOR	29
	4	1000242-34	FERRULE, ELEC CONDUCTOR	28
	6	1000242-33	FERRULE, ELEC CONDUCTOR	27
	2	1000242-30	FERRULE, ELEC CONDUCTOR	26
	2	1000242-22	FERRULE, ELEC CONDUCTOR	25
✱	245	1014341-11	WIRE, ELECTRICAL	24
✱	2.7	MIL-W-16878/4, E22 BRN	WIRE, ELECTRICAL	23
✱	2.7	MIL-W-16878/4, E22 WHT/RED	WIRE, ELECTRICAL	22
✱	2.7	MIL-W-16878/4, E22 ORG	WIRE, ELECTRICAL	21
✱	12.4	MIL-W-16878/4, E22 BLK	WIRE, ELECTRICAL	20
✱	78.9	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	19
✱	2.0	SEE NOTE 7	WIRE, BRAID	18
✱	4.0	SEE NOTE 7	WIRE, BRAID	17
✱	2.0	SEE NOTE 7	WIRE, BRAID	16
✱	2.0	SEE NOTE 7	WIRE, BRAID	15
✱	2.0	SEE NOTE 7	WIRE, BRAID	14
✱	0.2	SEE NOTE 6	SLEEVING	13
✱	0.2	SEE NOTE 6	SLEEVING	12
✱	0.3	SEE NOTE 6	SLEEVING	11
✱	0.2	SEE NOTE 6	SLEEVING	10
✱	0.2	SEE NOTE 6	SLEEVING	9
✱	1.7	SEE NOTE 5	SLEEVING	8
✱	2.0	SEE NOTE 5	SLEEVING	7
✱	6.0	SEE NOTE 5	SLEEVING	6
✱	2.0	SEE NOTE 5	SLEEVING	5
✱	2.0	SEE NOTE 5	SLEEVING	4
	1	1014472-9	BAND MARKER, CABLE	3
	2	1014472-9A	BAND MARKER, CABLE	2
	2	1010641-1	CONNECTOR	1

LIST OF MATERIALS

✱ DENOTES LENGTH IN FEET

SH 1	SH 2	SH 3	SH 4

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN R.S. Dragy DATE
CHECKED A. G. Caggiano 21 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W17
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020097
SCALE 1/1
WT
SHEET 1 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

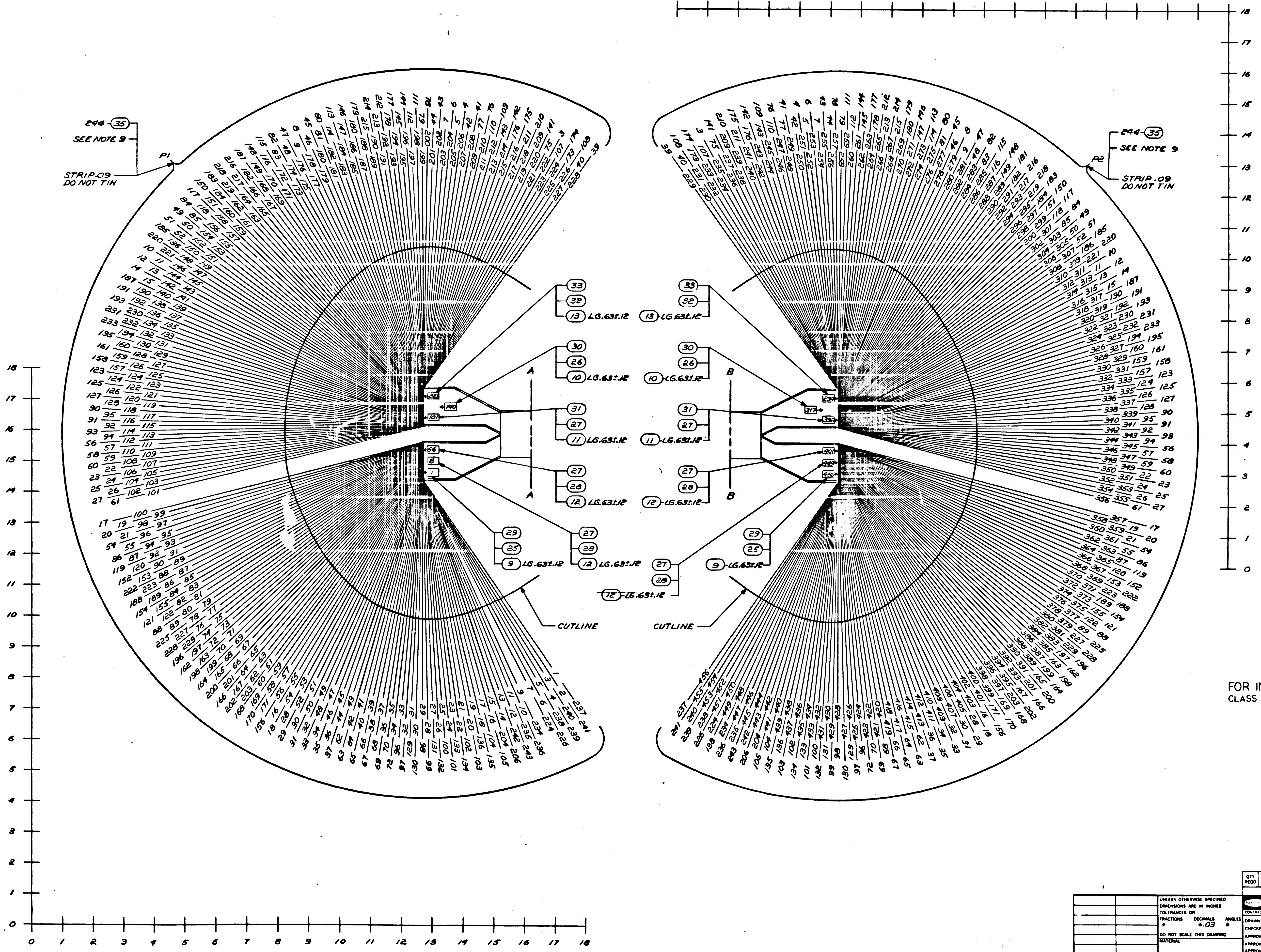
1020097

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO	
LIST OF MATERIALS				

1019965	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN P.S. Tracy DATE 9 Dec 63
CHECKED Anthony Cyganus 21 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W17
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020097
SCALE 1/1 WT SHEET 2 OF 4

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR		

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	228	BLK	22	20	229	
	226	WHT/RED	22	22	231	
	227	BRN	22	23	230	
SEE TWIST CHART	225	BLK	22	20	232	
	224	ORN	22	21	233	
**	223	SHIELD			234	**
	222	WHT	22	19	235	
	221	↕	↕	↕	236	
	220				237	
	219	WHT	22	19	238	
	218	WHT	22	24	239	
	217	BLK			240	
	216	WHT	22	24	241	
	215	BLK			242	
	214	WHT	22	24	243	
	213	BLK			244	
	212	WHT	22	24	245	
	211	BLK			246	
	210	WHT	22	24	247	
	209	BLK			248	
	208	WHT	22	24	249	
	207	BLK			250	
	206	WHT	22	24	251	
	205	BLK			252	
	204	WHT	22	24	253	
	203	BLK			254	
	202	WHT	22	24	255	
	201	BLK			256	
	200	WHT	22	24	257	
	199	BLK			258	
	198	WHT	22	24	259	ATTACH FIND NO.7 AND 18 LG21.50±.75
	197	BLK			260	
	196	WHT	22	24	261	
	195	BLK			262	
	194	WHT	22	24	263	
	193	BLK			264	
	192	WHT	22	24	265	
	191	BLK			266	
	190	WHT	22	24	267	
	189	BLK			268	
	188	WHT	22	24	269	
	187	BLK			270	
	186	WHT	22	24	271	
	185	BLK			272	
	184	WHT	22	24	273	
	183	BLK			274	
	182	WHT	22	24	275	
	181	BLK			276	
	180	WHT	22	24	277	
	179	BLK			278	
	178	WHT	22	24	279	
	177	BLK			280	
	176	WHT	22	24	281	
	175	BLK			282	
	174	WHT	22	24	283	
	173	BLK			284	
	172	WHT	22	24	285	
	171	BLK			286	
	170	WHT	22	24	287	
	169	BLK			288	
	168	WHT	22	24	289	
	167	BLK			290	
	166	WHT	22	24	291	
	165	BLK			292	
	164	WHT	22	24	293	
	163	BLK			294	
	162	WHT	22	24	295	
	161	BLK			296	
	160	WHT	22	24	297	
	159	BLK			298	
	158	WHT	22	24	299	ATTACH FIND NO.5 AND 15 LG21.50±.75
	157	BLK			300	
	156	WHT	22	24	301	
	155	BLK			302	
	154	WHT	22	24	303	
	153	BLK			304	
	152	WHT	22	24	305	
	151	BLK			306	
	150	WHT	22	24	307	
	149	BLK			308	

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	148	WHT	22	24	309	
	147	BLK			310	
	146	WHT	22	19	311	
	145	↕	↕	↕	312	
	144				313	
	143				314	
	142				315	
	141	WHT	22	19	316	
**	140	SHIELD			317	**
	139	WHT	22	24	318	
	138	BLK			319	
	137	WHT	22	24	320	
	136	BLK			321	
	135	WHT	22	24	322	
	134	BLK			323	
	133	WHT	22	24	324	
	132	BLK			325	
	131	WHT	22	24	326	
	130	BLK			327	
	129	WHT	22	24	328	
	128	BLK			329	
	127	WHT	22	19	330	
	126	WHT	22	19	331	
	125	WHT	22	19	332	
	124	WHT	22	24	333	
	123	BLK			334	ATTACH FIND NO.6 AND 16 LG21.50±.75
	122	WHT	22	24	335	
	121	BLK			336	
	120	WHT	22	24	337	
	119	BLK			338	
	118	WHT	22	24	339	
	117	BLK			340	
	116	WHT	22	24	341	
	115	BLK			342	
	114	WHT	22	24	343	
	113	BLK			344	
	112	WHT	22	24	345	
	111	BLK			346	
	110	WHT	22	19	347	
	109	↕	↕	↕	348	
	108				349	
	101				356	
	106	WHT	22	19	351	
	105	WHT	22	24	352	
	104	BLK			353	
	103	WHT	22	24	354	
	102	BLK			355	
**	107	SHIELD			350	**
	100	WHT	22	24	357	
	99	BLK			358	
	98	WHT	22	24	359	
	97	BLK			360	
	96	WHT	22	24	361	
	95	BLK			362	
	94	WHT	22	24	363	
	93	BLK			364	
	92	WHT	22	24	365	
	91	BLK			366	
	90	WHT	22	24	367	
	89	BLK			368	
	88	WHT	22	24	369	
	87	BLK			370	
	86	WHT	22	24	371	ATTACH FIND NO.6 AND 17 LG 21.50±.75
	85	BLK			372	
	84	WHT	22	24	373	
	83	BLK			374	
	82	WHT	22	24	375	
	81	BLK			376	
	80	WHT	22	24	377	
	79	BLK			378	
	78	WHT	22	24	379	
	77	BLK			380	
	76	WHT	22	24	381	
	75	BLK			382	
	74	WHT	22	24	383	
	73	BLK			384	
	72	WHT	22	24	385	
	71	BLK			386	
	70	WHT	22	24	387	
	69	BLK			388	

ASSEMBLY DESIGNATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	68	WHT	22	24	389	
	67	BLK			390	
	66	WHT	22	24	391	
	65	BLK			392	
	64	WHT	22	24	393	
	63	BLK			394	
	62	WHT	22	24	395	
	61	BLK			396	
	60	WHT	22	24	397	
	59	BLK			398	
	58	WHT	22	24	399	
	57	BLK			400	
**	56	SHIELD			401	**
	55	WHT	22	24	402	
	54	BLK			403	
	53	WHT	22	24	404	
	52	BLK			405	
	51	WHT	22	24	406	
	50	BLK			407	
	49	WHT	22	24	408	
	48	BLK			409	
	47	WHT	22	24	410	
	46	BLK			411	
	45	WHT	22	24	412	
	44	BLK			413	
	43	WHT	22	19	414	
	42	↕	↕	↕	415	
	41				416	
	40				417	
	39				418	
	38				419	
	37				420	
	36				421	
	35				422	
	34	WHT	22	19	423	
	33	WHT	22	24	424	
	32	BLK			425	ATTACH FIND NO.6 AND 17 LG21.50±.75
	31	WHT	22	24	426	
	30	BLK			427	
	29	WHT	22	24	428	
	28	BLK			429	
	27	WHT	22	24	430	
	26	BLK			431	
	25	WHT	22	24	432	
	24	BLK			433	
	23	WHT	22	24	434	
	22	BLK			435	
	21	WHT	22	24	436	
	20	BLK			437	
	19	WHT	22	24	438	
	18	BLK			439	
	17	WHT	22	24	440	
	16	BLK			441	
	15	WHT	22	24	442	
	14	BLK			443	
	13	WHT	22	24	444	
	12	BLK			445	
	11	WHT	22	24	446	
	10	BLK			447	
	9	WHT	22	19	448	
		SHIELD			449	**
	7	WHT	22	24	450	
	6	BLK			451	
	5	WHT	22	24	452	
	4	BLK			453	ATTACH FIND NO.4 AND 14 LG21.50±.75
	3	WHT	22	24	454	
	2	BLK			455	
**	1	SHIELD			456	**

TWIST CHART
228-229 WITH 226-221
225-232 WITH 224-233

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±
DECIMALS ±
DO NOT SCALE THIS DRAWING
MATERIAL

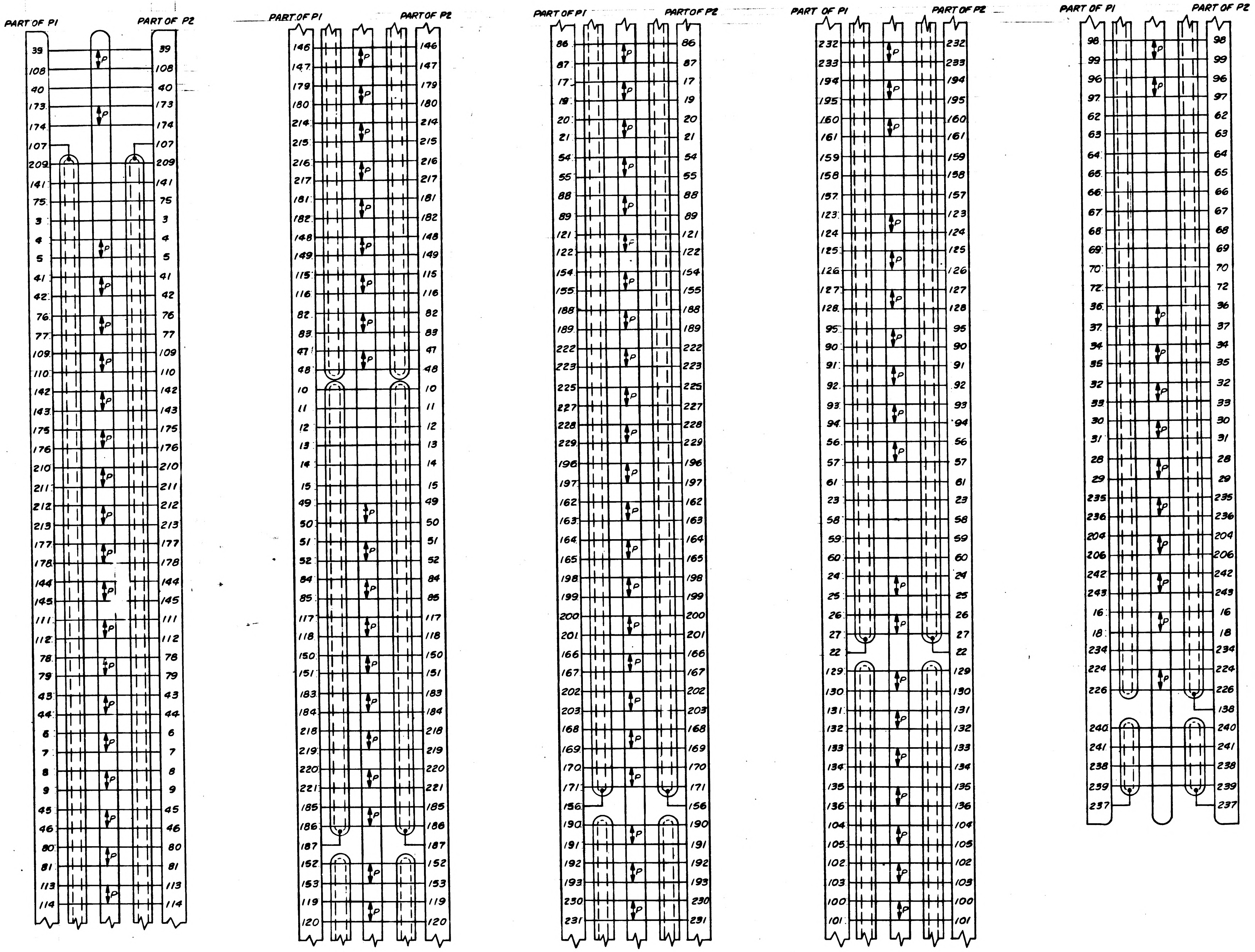
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN P.S. Tracy DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W17
AGC/CTS OPERATION CONSOLE

CODE IDENT NO ——
SIZE J
NASA DRAWING NO 1020097
SCALE NONE
WT
SHEET 3 OF 4

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF P1
PART OF P2
P
39, 108, 40, 173, 174, 107, 209, 141, 75, 3, 4, 5, 41, 42, 76, 77, 109, 110, 142, 143, 175, 176, 210, 211, 212, 213, 177, 178, 144, 145, 111, 112, 78, 79, 43, 44, 6, 7, 8, 9, 45, 46, 80, 81, 113, 114
146, 147, 179, 180, 214, 215, 216, 217, 181, 182, 148, 149, 115, 116, 82, 83, 47, 48, 10, 11, 12, 13, 14, 15, 49, 50, 51, 52, 84, 85, 117, 118, 150, 151, 183, 184, 218, 219, 220, 221, 185, 186, 187, 152, 153, 119, 120
86, 87, 17, 19, 20, 21, 54, 55, 88, 89, 121, 122, 154, 155, 188, 189, 222, 223, 225, 227, 228, 229, 196, 197, 162, 163, 164, 165, 198, 199, 200, 201, 166, 167, 202, 203, 168, 169, 170, 171, 156, 190, 191, 192, 193, 230, 231
232, 233, 194, 195, 160, 161, 159, 158, 157, 123, 124, 125, 126, 127, 128, 95, 90, 91, 92, 93, 94, 56, 57, 61, 23, 58, 59, 60, 24, 25, 26, 27, 22, 129, 130, 131, 132, 133, 134, 135, 136, 104, 105, 102, 103, 100, 101
98, 99, 96, 97, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 36, 37, 34, 35, 32, 33, 30, 31, 28, 29, 235, 236, 204, 206, 242, 243, 16, 18, 234, 224, 226, 138, 240, 241, 238, 239, 237

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
CHECKED
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W17
AGC/CTS OPERATION CONSOLE

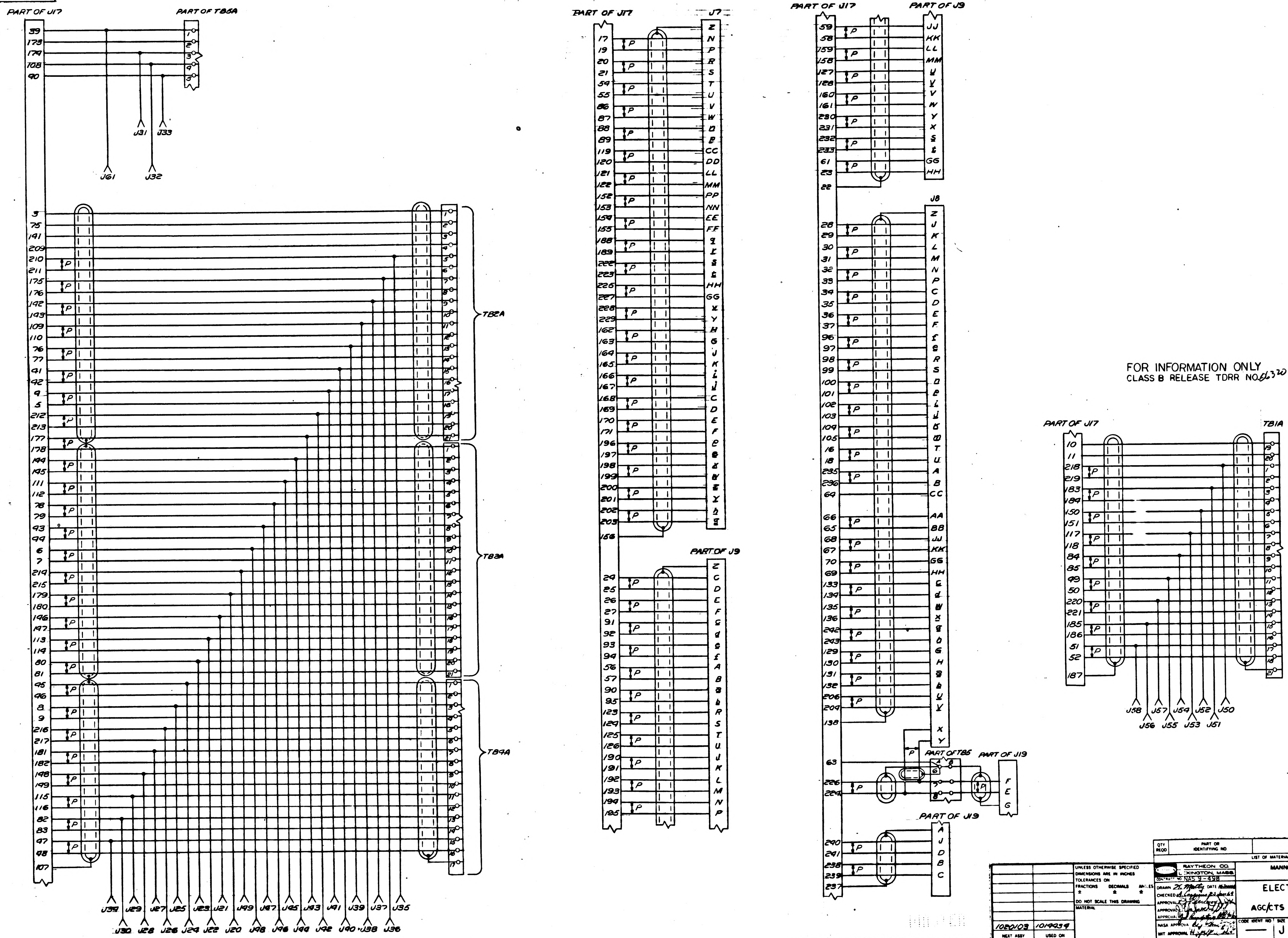
CODE IDENT NO — SIZE J NASA DRAWING NO 1020097
SCALE NONE WT SHEET 4 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF J17
PART OF TB5A
J61
J31
J33
J32
P
TB2A
TB3A
TB4A
J39
J29
J27
J25
J23
J21
J49
J47
J45
J43
J41
J39
J37
J35
J30
J28
J26
J24
J22
J20
J48
J46
J44
J42
J40
J38
J36
PART OF J17
J7
PART OF J9
PART OF J17
PART OF J9
J8
PART OF TB5
PART OF J19
PART OF J19
PART OF J17
TB1A
J58
J57
J54
J52
J50
J56
J55
J53
J51

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 62320 DATE 2/11/64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1020103	1019934

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Marty DATE
CHECKED A. Coggins 25 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

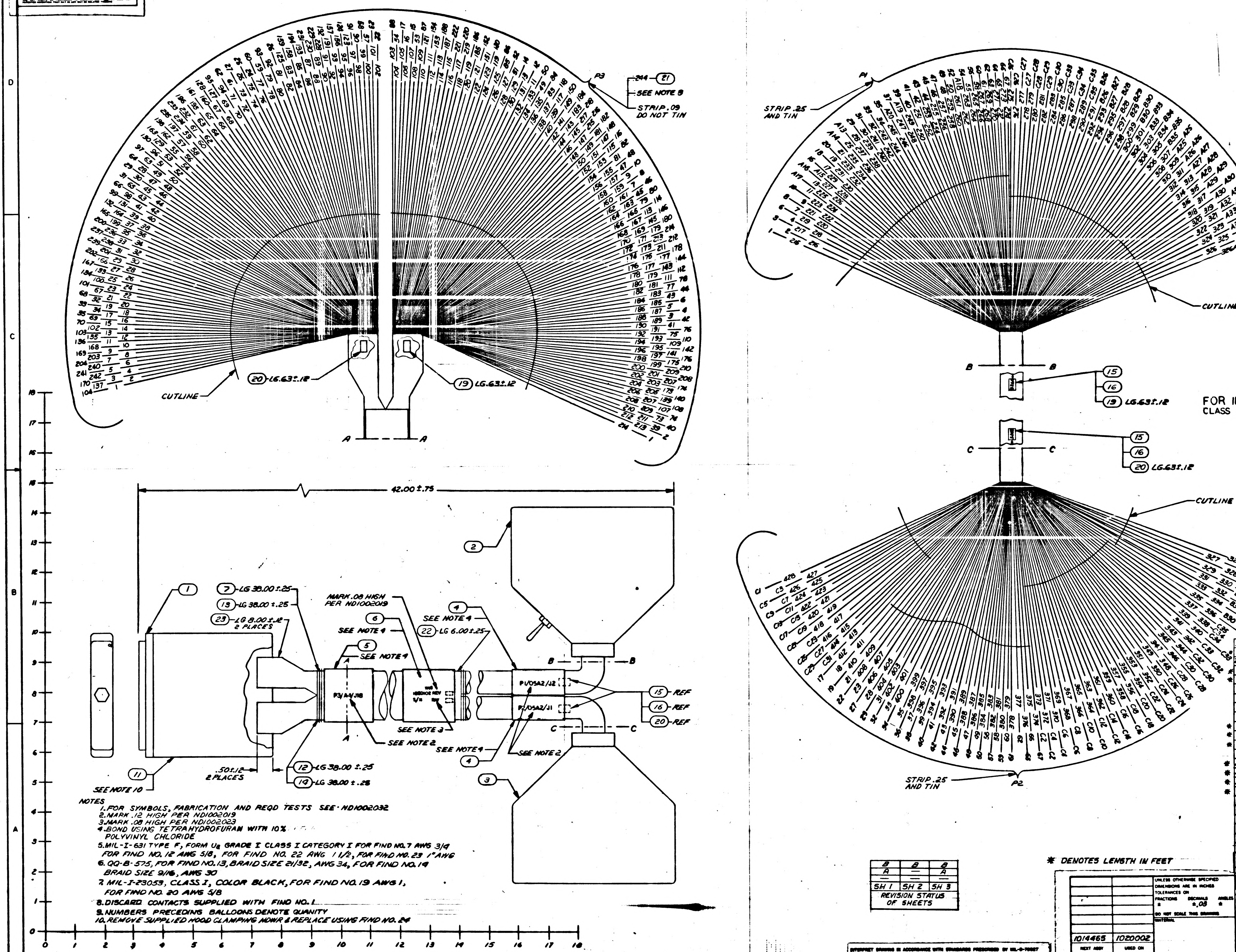
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020100
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD-R 5929 DR Q. Wheeler CHK A. Cassiano APPD	16 APR 64	K&B
B	CHANGE PER TDRR 10894 DR P. Hempfield CHK JCJ APPD	23 JUL 64	N&B



P3
244 — 21
SEE NOTE 8
STRIP .09 DO NOT TIN
CUTLINE
20 LG.63±.12
19 LG.63±.12
A — A
P1
STRIP .25 AND TIN
CUTLINE
B — B
15
16
19 LG.63±.12
C — C
15
16
20 LG.63±.12
CUTLINE
STRIP .25 AND TIN
P2
42.00±.75
1
7 LG 38.00±.25
13 LG 38.00±.25
23 LG 8.00±.12 2 PLACES
MARK .08 HIGH PER ND1002019
6
SEE NOTE 4
5
SEE NOTE 4
4
SEE NOTE 4
22 LG 6.00±.25
2
P3/A4/J18
SEE NOTE 3
SEE NOTE 2
SEE NOTE 4
4
SEE NOTE 2
P1/05A2/J2
P2/05A2/J1
15 REF
16 REF
20 REF
B — B
C — C
3
11
SEE NOTE 10
.50±.12 2 PLACES
12 LG 38.00±.25
14 LG 38.00±.25

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0635 DATE 11 FEB 64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U₂ GRADE I CLASS I CATEGORY I FOR FIND NO. 7 AWG 3/4 FOR FIND NO. 12 AWG 5/8, FOR FIND NO. 22 AWG 1 1/2, FOR FIND NO. 23 1" AWG
6. QQ-B-575, FOR FIND NO. 13, BRAID SIZE 21/32, AWG 34, FOR FIND NO. 14 BRAID SIZE 9/16, AWG 30
7. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 19 AWG 1, FOR FIND NO. 20 AWG 5/8
8. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
9. NUMBERS PRECEDING BALLOONS DENOTE QUANITY
10. REMOVE SUPPLIED HOOD CLAMPING HDWR & REPLACE USING FIND NO. 24

SEE SHEET 2

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	SEE NOTE 5	SLEEVING	23
*	.5	SEE NOTE 5	SLEEVING	22
	244	1010738-1	CONTACT, ELEC, PIN	21
*	.2	SEE NOTE 7	SLEEVING	20
*	.2	SEE NOTE 7	SLEEVING	19
	~~1~~	~~1000242-34~~	~~FERRULE, ELEC COND~~	~~18~~
	~~1~~	~~1000242-33~~	~~FERRULE, ELEC COND~~	~~17~~
	2	1000292-35	FERRULE, ELEC COND	16
	2	1000243-38	FERRULE, ELEC COND	15
*	3.2	SEE NOTE 6	WIRE, BRAID	14
*	3.2	SEE NOTE 6	WIRE, BRAID	13
*	3.2	SEE NOTE 5	SLEEVING	12
	1	1006225-1	HOOD, CONNECTOR	11
*	211	1014341-11	WIRE, ELECTRICAL	10
*	46.9	MIL-W-16878/4E22 WHT	WIRE, ELECTRICAL	9
*	21.2	MIL-W-16878/4E22 BLK	WIRE, ELECTRICAL	8
*	3.2	SEE NOTE 5	SLEEVING	7
	1	1014412-12	BAND MARKER, CABLE	6
	1	1014472-12A	BAND MARKER, CABLE	5
	2	1014472-6A	BAND MARKER, CABLE	4
	1	1020121	CONNECTOR ASSY	3
	1	1020184	CONNECTOR ASSY	2
	1	1010691-344	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

B	B	B
A	—	A
SH 1	SH 2	SH 3

REVISION STATUS OF SHEETS

1014465	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Dray DATE
CHECKED A. Cassiano 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

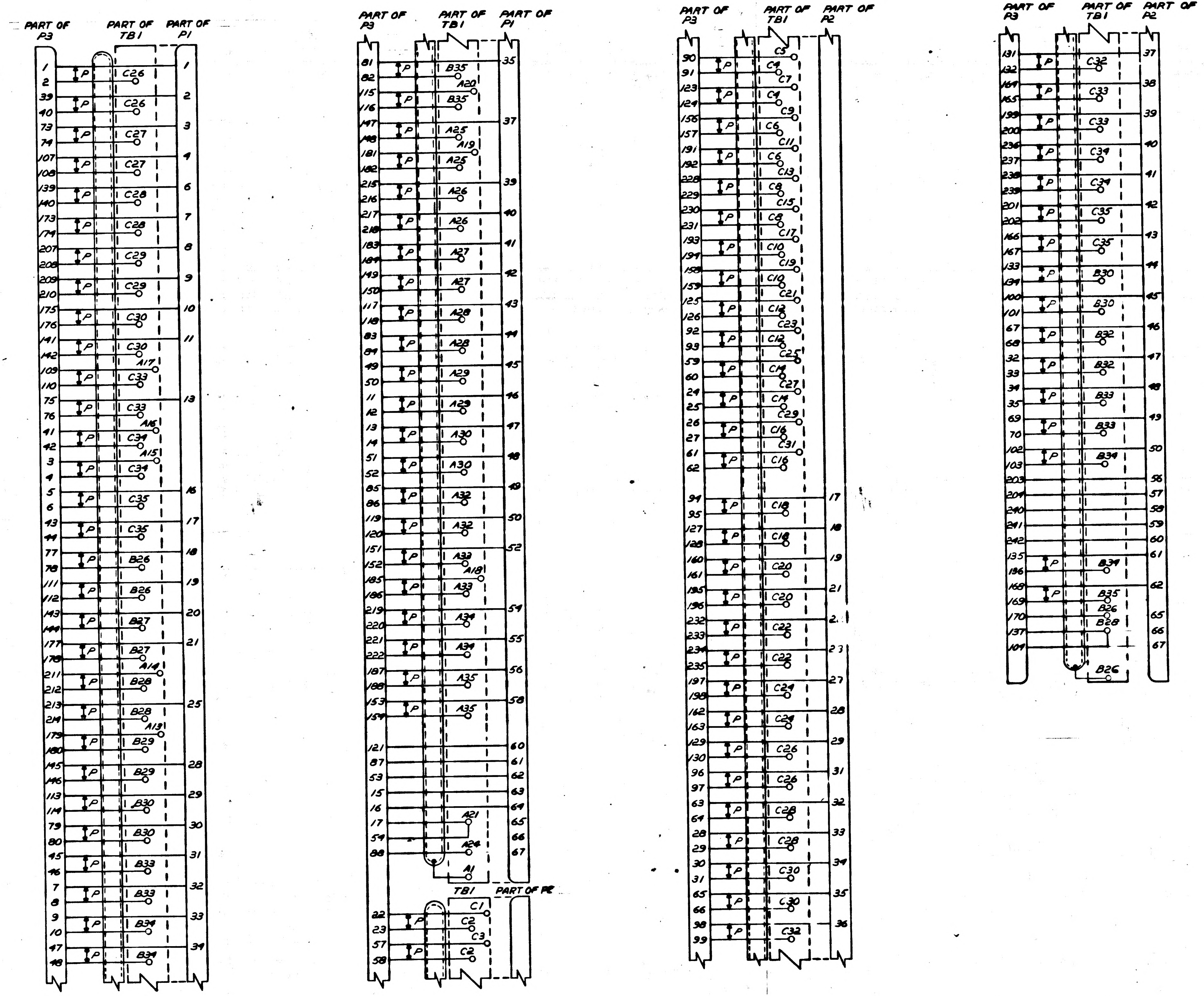
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W18
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020102
SCALE 1/1
WT
SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
B	CHANGE PER TDRR 10894 DR P. Winfield CHK J.C.J APPD [illegible]	23 JUL 64	[illegible]



ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

SEE SHEET 1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
4	MS35249-18	SCREW, FLAT HD	24

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Tracy DATE 18 DEC 63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-11-64

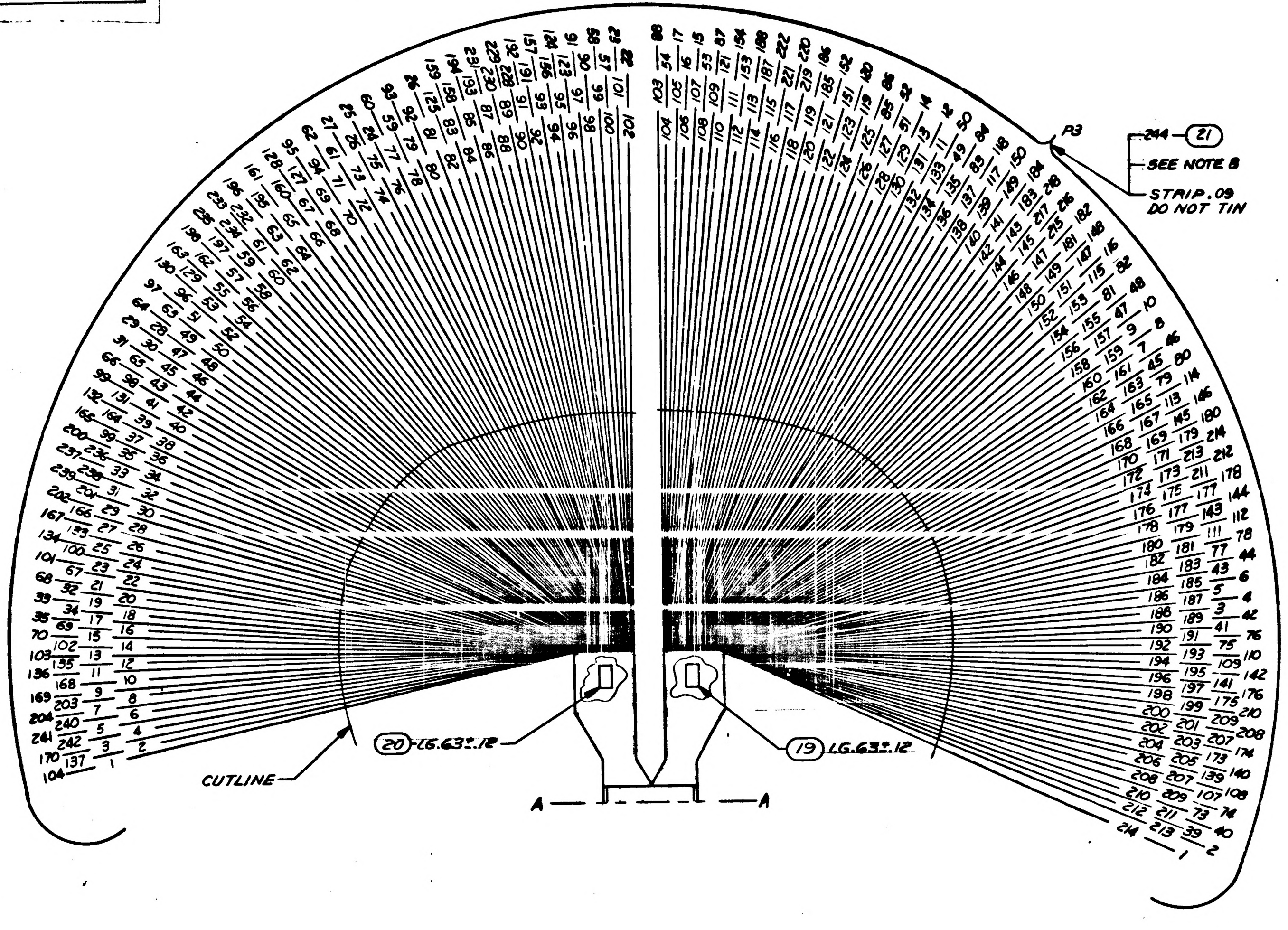
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

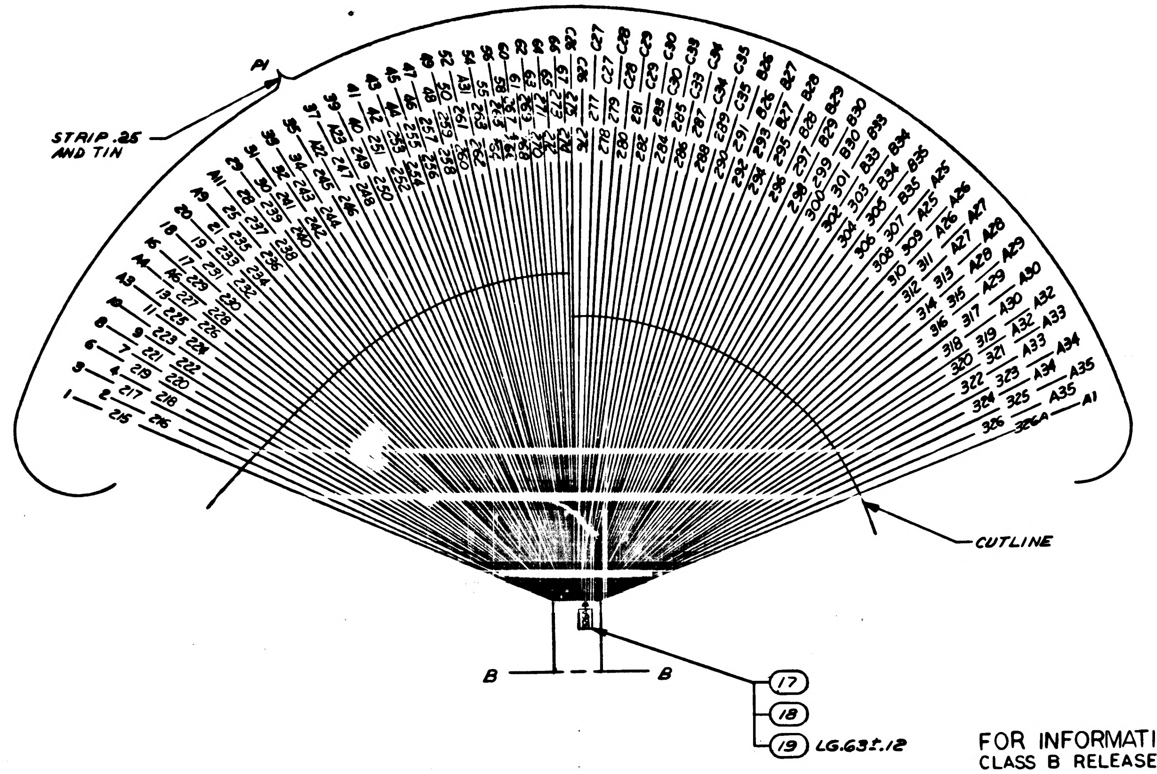
CABLE ASSEMBLY
W18
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020102
SCALE NONE
WT
SHEET 2 OF 3

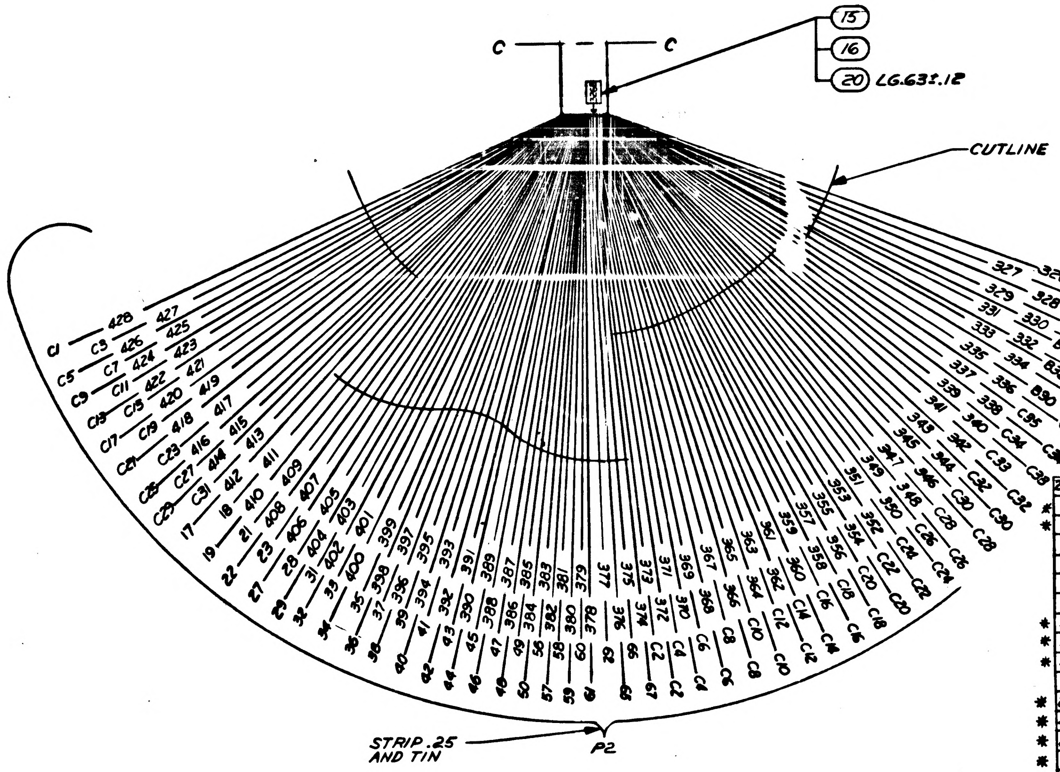
1020102

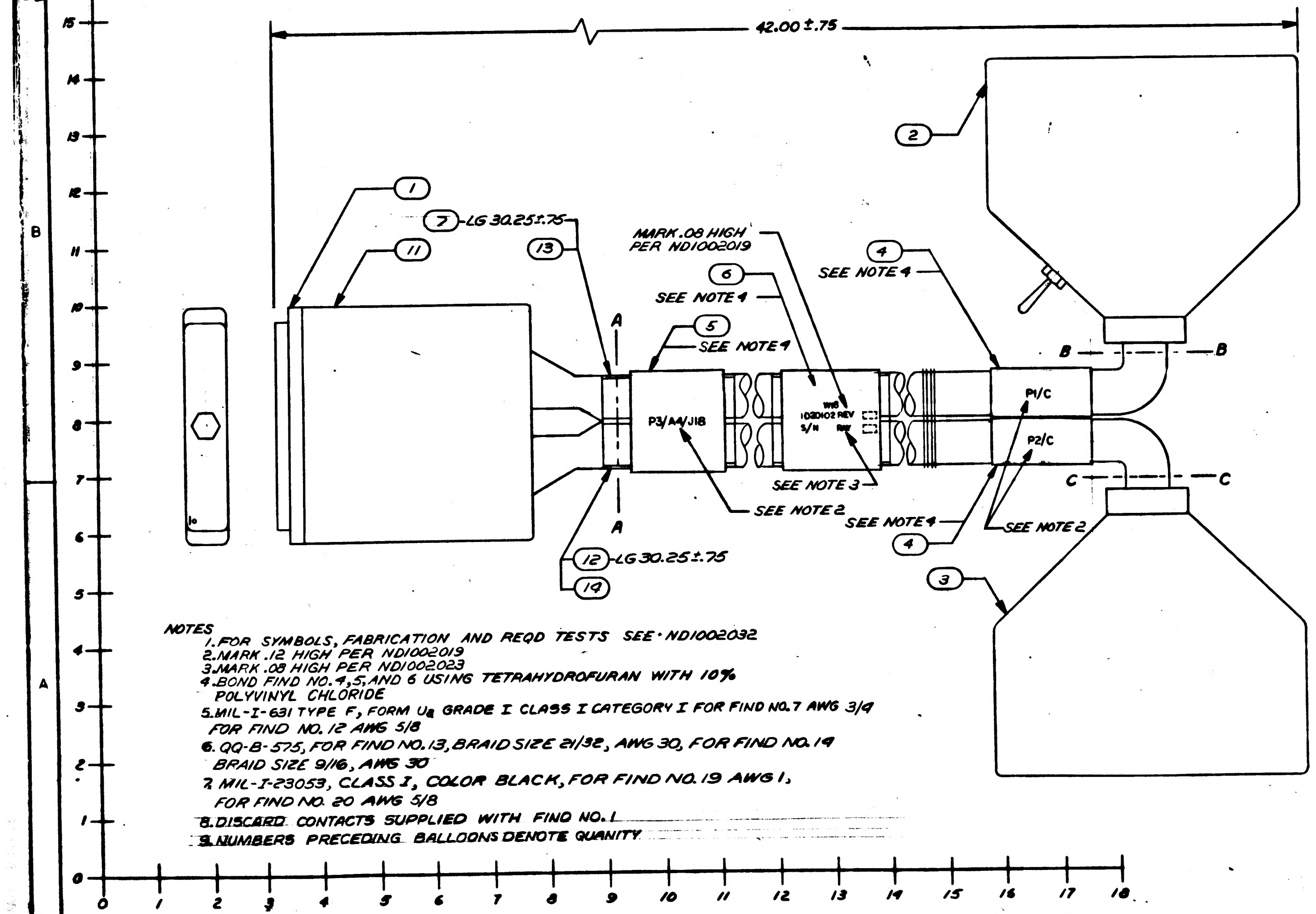
SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
—	CL B RELEASED PER TDRR		


P3
244 — 21
SEE NOTE 8
STRIP .09
DO NOT TIN
CUTLINE
20 LG.63±.12
19 LG.63±.12
A — A


P1
STRIP .25
AND TIN
CUTLINE
B — B
17
18
19 LG.63±.12

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0631 DATE 11 Feb 64


C — C
15
16
20 LG.63±.12
CUTLINE
STRIP .25
AND TIN
P2


42.00±.75
1
11
7 LG 30.25±.75
13
MARK .08 HIGH
PER ND1002019
6
SEE NOTE 4
5
SEE NOTE 4
4
SEE NOTE 4
2
A
A
P3/A4/J18
W18
1020102 REV
S/N
SEE NOTE 3
SEE NOTE 2
SEE NOTE 4
SEE NOTE 2
P1/C
P2/C
B
B
C
C
3
12 LG 30.25±.75
14
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO. 4, 5, AND 6 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631 TYPE F, FORM U$_a$ GRADE I CLASS I CATEGORY I FOR FIND NO. 7 AWG 3/4 FOR FIND NO. 12 AWG 5/8
6. QQ-B-575, FOR FIND NO. 13, BRAID SIZE 21/32, AWG 30, FOR FIND NO. 14 BRAID SIZE 9/16, AWG 30
7. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 19 AWG 1, FOR FIND NO. 20 AWG 5/8
8. DISCARD CONTACTS SUPPLIED WITH FIND NO. 1
9. NUMBERS PRECEDING BALLOONS DENOTE QUANITY

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	244	1010738-1	CONTACT, ELEC, PIN	21
*	.2	SEE NOTE 7	SLEEVING	20
*	.2	SEE NOTE 7	SLEEVING	19
	1	1000242-34	FERRULE, ELEC COND	18
	1	1000242-33	FERRULE, ELEC COND	17
	1	1000242-35	FERRULE, ELEC COND	16
	1	1000243-38	FERRULE, ELEC COND	15
*	3.2	SEE NOTE 6	WIRE, BRAID	14
*	3.2	SEE NOTE 6	WIRE, BRAID	13
*	3.2	SEE NOTE 5	SLEEVING	12
	1	1006225-1	HOOD, CONNECTOR	11
*	211	1014341-11	WIRE, ELECTRICAL	10
*	46.9	MIL-W-16878/4E22WHT	WIRE, ELECTRICAL	9
*	20.8	MIL-W-16878/4E22BLK	WIRE, ELECTRICAL	8
*	3.2	SEE NOTE 5	SLEEVING	7
	1	1014472-9	BAND MARKER, CABLE	6
	1	1014472-9A	BAND MARKER, CABLE	5
	2	1014472-4A	BAND MARKER, CABLE	4
	1	1020121	CONNECTOR ASSY	3
	1	1020120	CONNECTOR ASSY	2
	1	1010641-3	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

—	—	—
SH 1	SH 2	SH 3
REVISION STATUS OF SHEETS		

NEXT ASSY	USED ON
1014465	1020002
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTR NO NAS 9-498
DRAWN B.S. Dracy DATE 18 Dec 63
CHECKED A. Caggiano 15 Jan 64
APPROVED
APPROVED
APPROVED
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

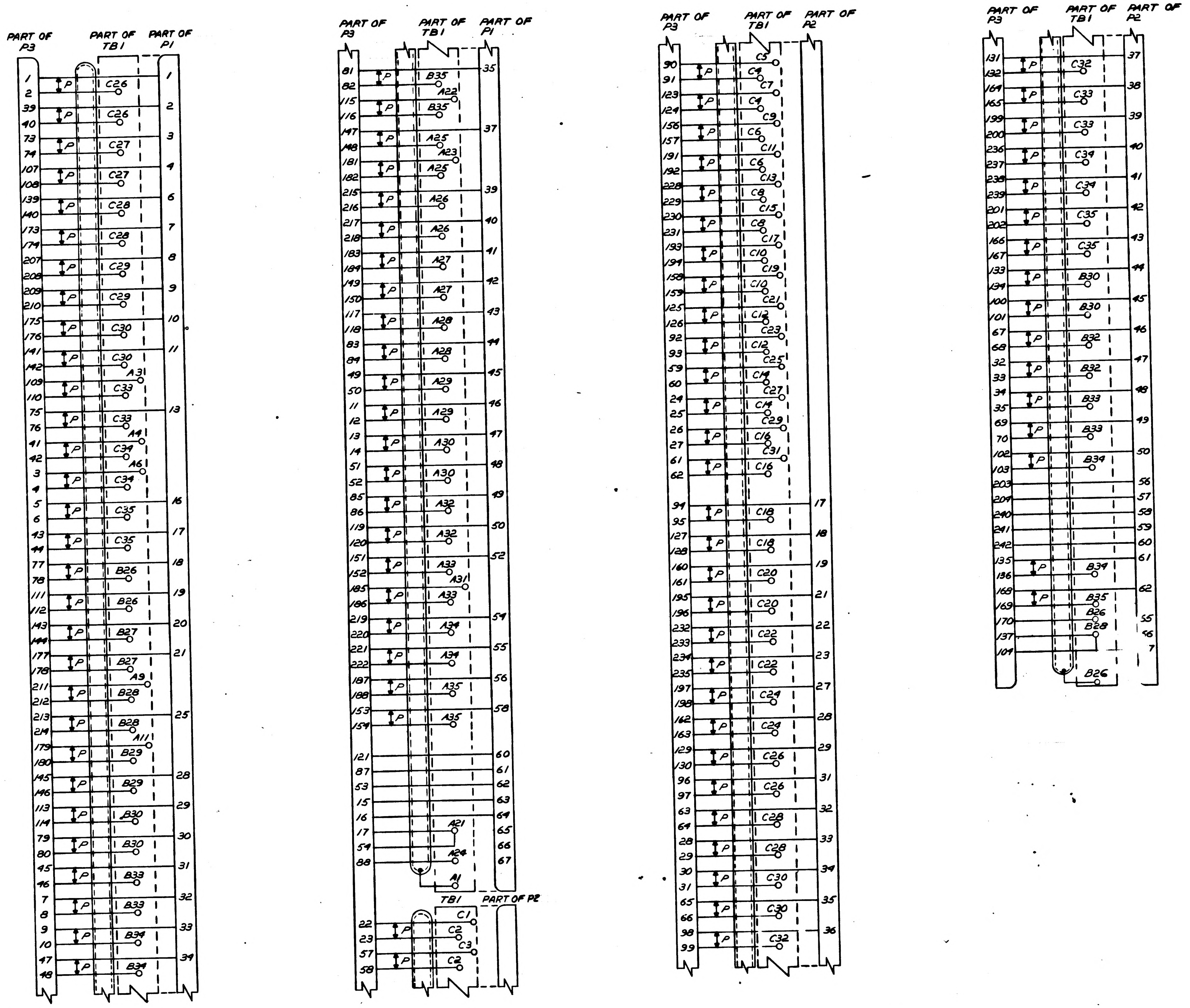
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W18
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. SIZE J NASA DRAWING NO 1020102
SCALE 1/1 WT SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR		



ELECTRICAL SCHEMATIC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11Feb64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014465	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Tracy DATE 18DEC63
CHECKED 15 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 11 Feb 64
MIT APPROVAL 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W18
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020102
SCALE NONE WT SHEET 2 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASEDPER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	214	WHT	22	10	215	
	213	BLK			275	
	212	WHT	22	10	216	
	211	BLK			276	
	210	WHT	22	10	217	
	209	BLK			277	
	208	WHT	22	10	218	
	207	BLK			278	
	206	WHT	22	10	219	
	205	BLK			279	
	204	WHT	22	10	220	
	203	BLK			280	
	202	WHT	22	10	221	
	201	BLK			281	
	200	WHT	22	10	222	
	199	BLK			282	
	198	WHT	22	10	223	
	197	BLK			283	
	196	WHT	22	10	224	
	195	BLK			284	
	194	WHT	22	10	225	
	193	BLK			285	
	192	WHT	22	10	226	
	191	BLK			286	
	190	WHT	22	10	227	
	189	BLK			287	
	188	WHT	22	10	228	
	187	BLK			288	
	186	WHT	22	10	229	
	185	BLK			289	
	184	WHT	22	10	230	
	183	BLK			290	
	182	WHT	22	10	231	
	181	BLK			291	
	180	WHT	22	10	232	
	179	BLK			292	
	178	WHT	22	10	233	
	177	BLK			293	
	176	WHT	22	10	234	
	175	BLK			294	
	174	WHT	22	10	235	
	173	BLK			295	
	172	WHT	22	10	236	
	171	BLK			296	
	170	WHT	22	10	237	
	169	BLK			297	
	168	WHT	22	10	238	
	167	BLK			298	
	166	WHT	22	10	239	
	165	BLK			299	
	164	WHT	22	10	240	
	163	BLK			300	
	162	WHT	22	10	241	
	161	BLK			301	
	160	WHT	22	10	242	
	159	BLK			302	
	158	WHT	22	10	243	
	157	BLK			303	
	156	WHT	22	10	244	
	155	BLK			304	
	154	WHT	22	10	245	
	153	BLK			305	
	152	WHT	22	10	246	
	151	BLK			306	
	150	WHT	22	10	247	
	149	BLK			307	
	148	WHT	22	10	248	
	147	BLK			308	
	146	WHT	22	10	249	
	145	BLK			309	
	144	WHT	22	10	250	
	143	BLK			310	
	142	WHT	22	10	251	
	141	BLK			311	
	105	BLK	22	8	272	
	104	BLK	22	8	273	
	103	BLK	22	8	274	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	140	WHT	22	10	252	
	139	BLK			312	
	138	WHT	22	10	253	
	137	BLK			313	
	136	WHT	22	10	254	
	135	BLK			314	
	134	WHT	22	10	255	
	133	BLK			315	
	132	WHT	22	10	256	
	131	BLK			316	
	130	WHT	22	10	257	
	129	BLK			317	
	128	WHT	22	10	258	
	127	BLK			318	
	126	WHT	22	10	259	
	125	BLK			319	
	124	WHT	22	10	260	
	123	BLK			320	
	122	WHT	22	10	261	
	121	BLK			321	
	120	WHT	22	10	262	
	119	BLK			322	
	118	WHT	22	10	263	
	117	BLK			323	
	116	WHT	22	10	264	
	115	BLK			324	
	114	WHT	22	10	265	
	113	BLK			325	
	112	WHT	22	10	266	
	111	BLK			326	
	110	WHT	22	9	267	
	109				268	
	108	↕	↕	↕	269	
	107				270	
	106	WHT	22	9	271	
		SHLD			362A	ATTACH FIND NO. 8 LG 5.5
	102	WHT	22	10	428	
	101	BLK			373	
	100	WHT	22	10	427	
	99	BLK			372	
	98	WHT	22	10	426	
	97	BLK			371	
	96	WHT	22	10	425	
	95	BLK			370	
	94	WHT	22	10	424	
	93	BLK			369	
	92	WHT	22	10	423	
	91	BLK			368	
	90	WHT	22	10	422	
	89	BLK			367	
	88	WHT	22	10	421	
	87	BLK			366	
	86	WHT	22	10	420	
	85	BLK			365	
	84	WHT	22	10	419	
	83	BLK			364	
	82	WHT	22	10	418	
	81	BLK			363	
	80	WHT	22	10	417	
	79	BLK			362	
	78	WHT	22	10	416	
	77	BLK			361	
	76	WHT	22	10	415	
	75	BLK			360	
	74	WHT	22	10	414	
	73	BLK			359	
	72	WHT	22	10	413	
	71	BLK			358	
	70	WHT	22	10	412	
	69	BLK			357	
	68	WHT	22	10	411	
	67	BLK			356	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO	COLOR	AWG	FIND NO	RUN NO	REMARKS
	66	WHT	22	10	410	
	65	BLK			355	
	64	WHT	22	10	409	
	63	BLK			354	
	62	WHT	22	10	408	
	61	BLK			353	
	60	WHT	22	10	407	
	59	BLK			352	
	58	WHT	22	10	406	
	57	BLK			351	
	56	WHT	22	10	405	
	55	BLK			350	
	54	WHT	22	10	404	
	53	BLK			349	
	52	WHT	22	10	403	
	51	BLK			348	
	50	WHT	22	10	402	
	49	BLK			347	
	48	WHT	22	10	401	
	47	BLK			346	
	46	WHT	22	10	400	
	45	BLK			345	
	44	WHT	22	10	399	
	43	BLK			344	
	42	WHT	22	10	398	
	41	BLK			343	
	40	WHT	22	10	397	
	39	BLK			342	
	38	WHT	22	10	396	
	37	BLK			341	
	36	WHT	22	10	395	
	35	BLK			340	
	34	WHT	22	10	394	
	33	BLK			339	
	32	WHT	22	10	393	
	31	BLK			338	
	30	WHT	22	10	392	
	29	BLK			337	
	28	WHT	22	10	391	
	27	BLK			336	
	26	WHT	22	10	390	
	25	BLK			335	
	24	WHT	22	10	389	
	23	BLK			334	
	22	WHT	22	10	388	
	[illegible]	BLK			333	
	20	WHT	22	10	387	
	19	BLK			332	
	18	WHT	22	10	386	
	17	BLK			331	
	16	WHT	22	10	385	
	15	BLK			330	
	14	WHT	22	10	384	
	13	BLK			329	
	12	WHT	22	10	378	
	11	BLK			328	
	10	WHT	22	10	377	
	9	BLK			327	
	8	WHT	22	9	383	
	7				382	
	6	↕	↕	↕	381	
	5				380	
	4	WHT	22	9	379	
	3	BLK	22	8	376	
	2	BLK	22	8	375	
	1	BLK	22	8	374	
		SHLD			326B	ATTACH FIND NO. 8 LG 5.5

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1014465	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.S. Tracy DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W18
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020102
SCALE NONE WT SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

1050105

1050105

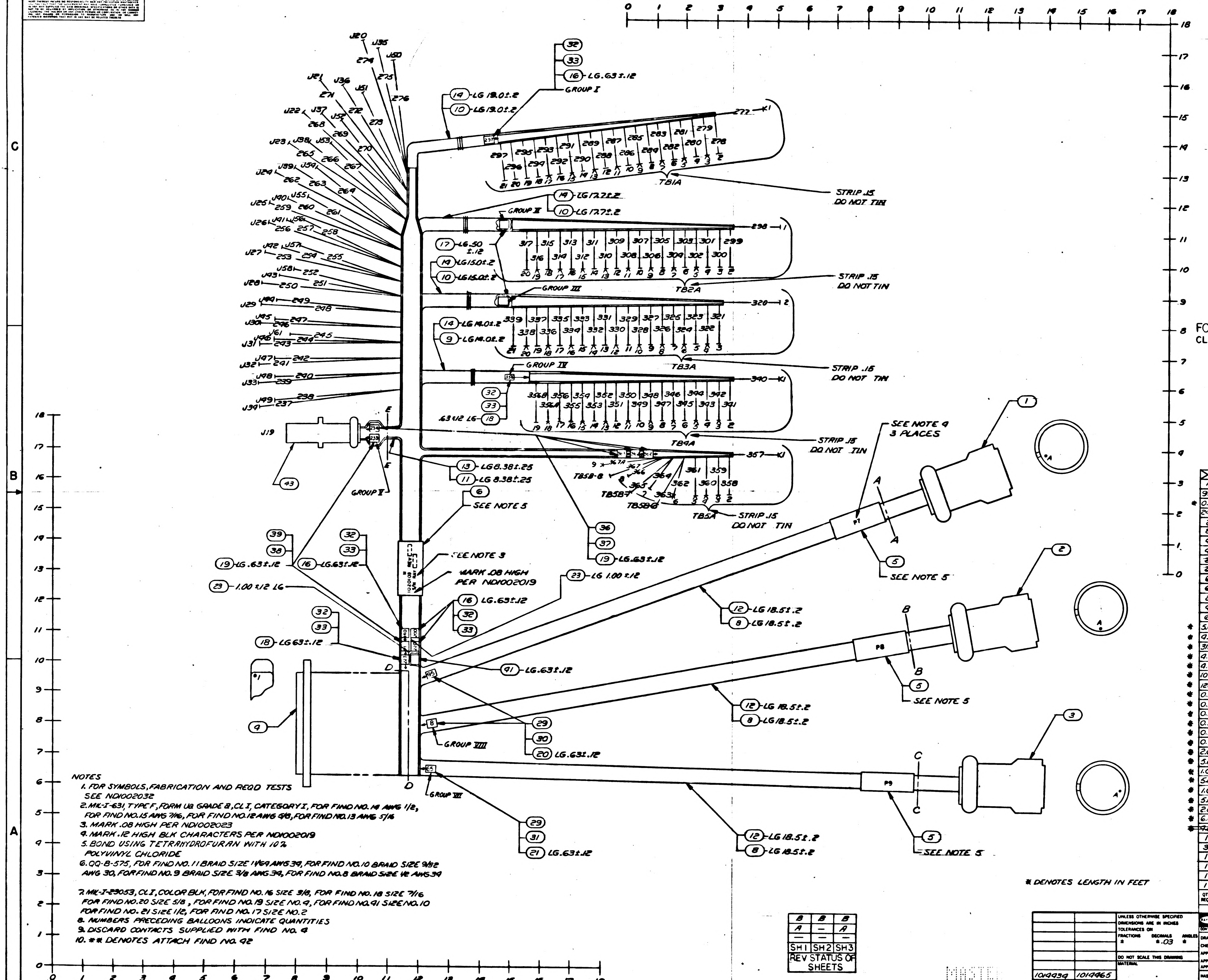
30 14

50

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 06320		
B	CHANGED PER TDRR 10091 DR. W. Dunn CHK. Boyer APPD	5/4/64	11/25



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
J20
J35
J50
274
275
276
J21
J36
J51
271
272
273
J22
J37
J52
268
269
270
J23
J38
J53
265
266
267
J24
J39
J54
262
263
264
J25
J40
J55
259
260
261
J26
J41
J56
256
257
258
J27
J42
J57
253
254
255
J58
252
J43
J28
250
251
J29
J44
249
248
J30
J45
247
246
J61
J31
J46
245
244
243
J47
J32
242
241
J48
J33
240
239
J49
J34
238
237
J19
43
32
33
16 LG .63 ±.12
GROUP I
14 LG 19.0 ±.2
10 LG 19.0 ±.2
297
272 — K1
TB1A
STRIP .15 DO NOT TIN
14 LG 12.7 ±.2
10 LG 12.7 ±.2
GROUP II
298 — 1
17 LG .50 ±.12
14 LG 15.0 ±.2
10 LG 15.0 ±.2
TB2A
STRIP .15 DO NOT TIN
GROUP III
320 — 2
14 LG 14.0 ±.2
9 LG 14.0 ±.2
TB3A
STRIP .15 DO NOT TIN
GROUP IV
356
340 — K1
32
33
.63 ±.12 LG 18
TB4A
STRIP .15 DO NOT TIN
357 — K1
367A
367
366
365
364
363
362
TB5B-8
TB5B7
TB5B6
TB5A
STRIP .15 DO NOT TIN
E
E
234
233
13 LG 8.38 ±.25
11 LG 8.38 ±.25
GROUP V
6
SEE NOTE 5
39
38
19 LG .63 ±.12
32
33
16 LG .63 ±.12
SEE NOTE 3
MARK .08 HIGH PER ND1002019
1020103 REV S/N RAY
23 1.00 ±.12 LG
36
37
19 LG .63 ±.12
23 LG 1.00 ±.12
16 LG .63 ±.12
32
33
32
33
18 LG .63 ±.12
D
D
91 LG .63 ±.12
95
4
1
8
GROUP VIII
29
30
20 LG .63 ±.12
65
GROUP VII
29
31
21 LG .63 ±.12
SEE NOTE 4 3 PLACES
1
P7
A
A
5
SEE NOTE 5
12 LG 18.5 ±.2
8 LG 18.5 ±.2
2
P8
B
B
5
SEE NOTE 5
12 LG 18.5 ±.2
8 LG 18.5 ±.2
3
P9
C
C
5
SEE NOTE 5
12 LG 18.5 ±.2
8 LG 18.5 ±.2
A
A
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2-11-64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631, TYPE F, FORM U, GRADE A, CL I, CATEGORY I, FOR FIND NO. 14 AWG 1/2, FOR FIND NO. 15 AWG 7/16, FOR FIND NO. 12 AWG 5/8, FOR FIND NO. 13 AWG 5/16
3. MARK .08 HIGH PER ND1002023
4. MARK .12 HIGH BLK CHARACTERS PER ND1002019
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. QQ-B-575, FOR FIND NO. 11 BRAID SIZE 1/64 AWG 34, FOR FIND NO. 10 BRAID SIZE 9/32 AWG 30, FOR FIND NO. 9 BRAID SIZE 3/8 AWG 34, FOR FIND NO. 8 BRAID SIZE 1/2 AWG 34
7. MIL-I-23053, CL I, COLOR BLK, FOR FIND NO. 16 SIZE 3/8, FOR FIND NO. 18 SIZE 7/16 FOR FIND NO. 20 SIZE 5/8, FOR FIND NO. 19 SIZE NO. 4, FOR FIND NO. 91 SIZE NO. 10 FOR FIND NO. 21 SIZE 1/2, FOR FIND NO. 17 SIZE NO. 2
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 4
10. ** DENOTES ATTACH FIND NO. 42

* DENOTES LENGTH IN FEET

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1020100	SCHEMATIC, ELEC	REF
1	MS3120F-12-10S	CONNECTOR, WALL MTG	43
92	MS25036-1	TERMINAL, LUG	42
* 0.5	SEE NOTE 7	SLEEVING	41
244	1010738-2	CONTACT, ELEC, SOCKETS	40
2	1000243-18	FERRULE, ELEC COND	39
2	1000242-18	FERRULE, ELEC COND	38
4	1000242-9	FERRULE, ELEC COND	37
4	1000243-9	FERRULE, ELEC COND	36
~~2~~	~~1000242-30~~	~~FERRULE, ELEC COND~~	~~35~~
~~2~~	~~1000243-34~~	~~FERRULE, ELEC COND~~	~~34~~
6	1000242-29	FERRULE, ELEC COND	33
6	1000243-33	FERRULE, ELEC COND	32
2	1000243-37	FERRULE, ELEC COND	31
4	1000243-36	FERRULE, ELEC COND	30
6	1000242-33	FERRULE, ELEC COND	29
* 5.0	ND1002181, TYPE II, CL 4	WIRE, ELEC AWG 22 BLK/WHT	28
* 4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHT/RED	27
* 312	1014341-11	WIRE, ELEC	26
* 4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BRN	25
* 4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, ORN	24
* 10.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BLK	23
* 120	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHT	22
* 0.5	SEE NOTE 7	SLEEVING	21
* 0.5	SEE NOTE 7	SLEEVING	20
* 0.5	SEE NOTE 7	SLEEVING	19
* 0.5	SEE NOTE 7	SLEEVING	18
* 0.5	SEE NOTE 7	SLEEVING	17
* 0.5	SEE NOTE 7	SLEEVING	16
* 2.0	SEE NOTE 2	SLEEVING	15
* 5.0	SEE NOTE 2	SLEEVING	14
* 1.0	SEE NOTE 2	SLEEVING	13
* 5.0	SEE NOTE 2	SLEEVING	12
* 1.0	SEE NOTE 6	BRAID, WIRE	11
* 5.0	SEE NOTE 6	BRAID, WIRE	10
* 2.0	SEE NOTE 6	BRAID, WIRE	9
* 6.0	SEE NOTE 6	BRAID, WIRE	8
~~* 4.0~~	~~SEE NOTE 6~~	~~BRAID, WIRE~~	~~7~~
1	1019472-6	BAND MARKER, CABLE	6
3	1019472-4A	BAND MARKER, CABLE	5
1	1010692-1	CONNECTOR	4
1	MS3126F-24-61PX	CONNECTOR, PLUG	3
1	MS3126F-24-61PY	CONNECTOR, PLUG	2
1	MS3126F-24-61S	CONNECTOR, PLUG	1

LIST OF MATERIALS

B	B	B
A	—	A
—	—	—
SH1	SH2	SH3

REV STATUS OF SHEETS

MASTER

NEXT ASSY	USED ON
1014934	1014965

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

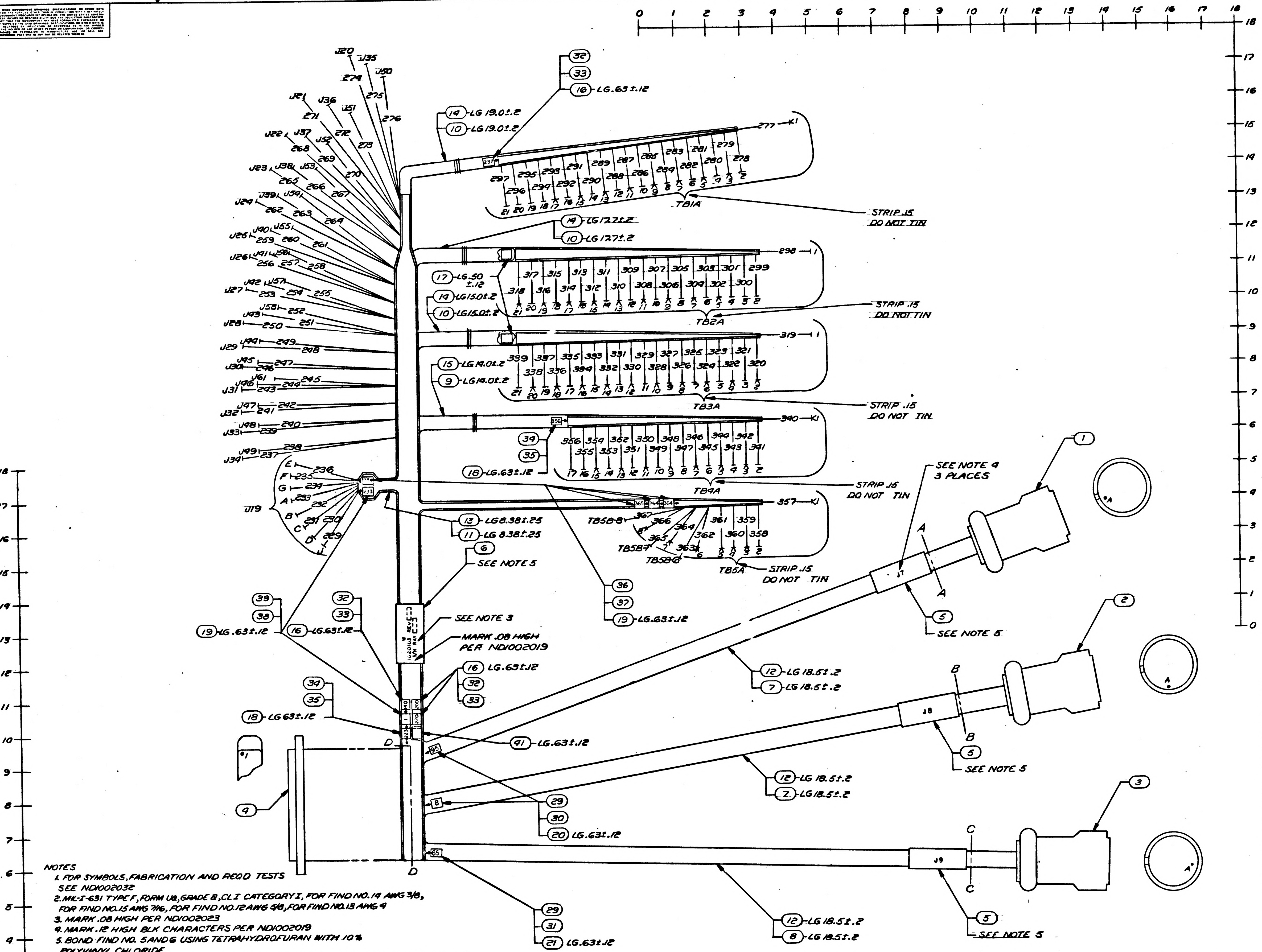
CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020103

SCALE 1/1 WT SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 04320	2-11-64	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 04320 DATE 2-11-64


J20
J35
J50
J21
J36
J51
J22
J37
J52
J23
J38
J53
J24
J39
J54
J25
J40
J55
J26
J41
J56
J27
J42
J57
J28
J43
J58
J29
J44
J30
J45
J31
J46
J61
J32
J47
J33
J48
J34
J49
J19
E
F
G
A
B
C
D
277 — K1
298 — 1
319 — 1
340 — K1
357 — K1
TB1A
TB2A
TB3A
TB4A
TB5A
TB5B-8
TB5B-7
TB5B-6
STRIP .15 DO NOT TIN
14 - LG 19.0 ± .2
10 - LG 19.0 ± .2
16 - LG .63 ± .12
14 - LG 12.7 ± .2
10 - LG 12.7 ± .2
17 - LG .50 ± .12
14 - LG 15.0 ± .2
10 - LG 15.0 ± .2
15 - LG 14.0 ± .2
9 - LG 14.0 ± .2
18 - LG .63 ± .12
13 - LG 8.38 ± .25
11 - LG 8.38 ± .25
SEE NOTE 5
SEE NOTE 3
MARK .08 HIGH PER ND1002019
19 - LG .63 ± .12
16 - LG .63 ± .12
91 - LG .63 ± .12
20 - LG .63 ± .12
21 - LG .63 ± .12
12 - LG 18.5 ± .2
7 - LG 18.5 ± .2
8 - LG 18.5 ± .2
SEE NOTE 4 3 PLACES
J7
J8
J9
A
B
C
D
1
2
3
4
5
6
8
65
95

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM U2, GRADE A, CL I CATEGORY I, FOR FIND NO. 14 AWG 3/8, FOR FIND NO. 15 AWG 7/16, FOR FIND NO. 12 AWG 4/8, FOR FIND NO. 13 AWG 4
3. MARK .08 HIGH PER ND1002023
4. MARK .12 HIGH BLK CHARACTERS PER ND1002019
5. BOND FIND NO. 5 AND 6 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. QQ-B-575, FOR FIND NO. 11 BRAID SIZE 1/64 AWG 34, FOR FIND NO. 10 BRAID SIZE 9/32 AWG 30, FOR FIND NO. 9 BRAID SIZE 3/8 AWG 34, FOR FIND NO. 8 BRAID SIZE 1/2 AWG 34, FOR FIND NO. 7 BRAID SIZE 9/16 AWG 30
7. MIL-I-23053, CL I, COLOR BLK, FOR FIND NO. 16 SIZE 3/8, FOR FIND NO. 18 SIZE 7/16 FOR FIND NO. 20 SIZE 5/8, FOR FIND NO. 19 SIZE NO. 4, FOR FIND NO. 91 SIZE NO. 10 FOR FIND NO. 21 SIZE 1/2, FOR FIND NO. 17 SIZE NO. 2
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 4
10. ** DENOTES ATTACH FIND NO. 42

* DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020100	SCHEMATIC, ELEC	REF
	92	MS25036-1	TERMINAL, LUG	42
*	0.5	SEE NOTE 7	SLEEVING	41
	244	1010738-2	CONTACT, ELEC, SOCKETS	40
	2	1000243-18	FERRULE, ELEC COND	39
	2	1000242-18	FERRULE, ELEC COND	38
	4	1000242-9	FERRULE, ELEC COND	37
	4	1000243-9	FERRULE, ELEC COND	36
	2	1000242-30	FERRULE, ELEC COND	35
	2	1000243-34	FERRULE, ELEC COND	34
	4	1000242-29	FERRULE, ELEC COND	33
	4	1000243-32	FERRULE, ELEC COND	32
	2	1000243-37	FERRULE, ELEC COND	31
	4	1000242-34	FERRULE, ELEC COND	30
	6	1000242-33	FERRULE, ELEC COND	29
*	5.0	ND1002181, TYPE II, CL4	WIRE, ELEC AWG 22 BLK/WHT	28
*	4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHT/RED	27
*	312	1014341-11	WIRE, ELEC	26
*	4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BRN	25
*	4.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, ORN	24
*	10.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BLK	23
*	120	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHT	22
*	0.5	SEE NOTE 7	SLEEVING	21
*	0.5	SEE NOTE 7	SLEEVING	20
*	0.5	SEE NOTE 7	SLEEVING	19
*	0.5	SEE NOTE 7	SLEEVING	18
*	0.5	SEE NOTE 7	SLEEVING	17
*	0.5	SEE NOTE 7	SLEEVING	16
*	2.0	SEE NOTE 2	SLEEVING	15
*	5.0	SEE NOTE 2	SLEEVING	14
*	1.0	SEE NOTE 2	SLEEVING	13
*	5.0	SEE NOTE 2	SLEEVING	12
*	1.0	SEE NOTE 6	BRAID, WIRE	11
*	5.0	SEE NOTE 6	BRAID, WIRE	10
*	2.0	SEE NOTE 6	BRAID, WIRE	9
*	2.0	SEE NOTE 6	BRAID, WIRE	8
*	4.0	SEE NOTE 6	BRAID, WIRE	7
	1	1014972-5	BAND MARKER, CABLE	6
	3	1014972-4A	BAND MARKER, CABLE	5
	1	1010642-1	CONNECTOR	4
	1	MS3126F-24-61PX	CONNECTOR, PLUG	3
	1	MS3126F-24-61PY	CONNECTOR, PLUG	2
	1	MS3126F-24-61S	CONNECTOR, PLUG	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014934	1014965

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN
CHECKED 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020103
SCALE 1/1 WT SHEET 1 OF 3

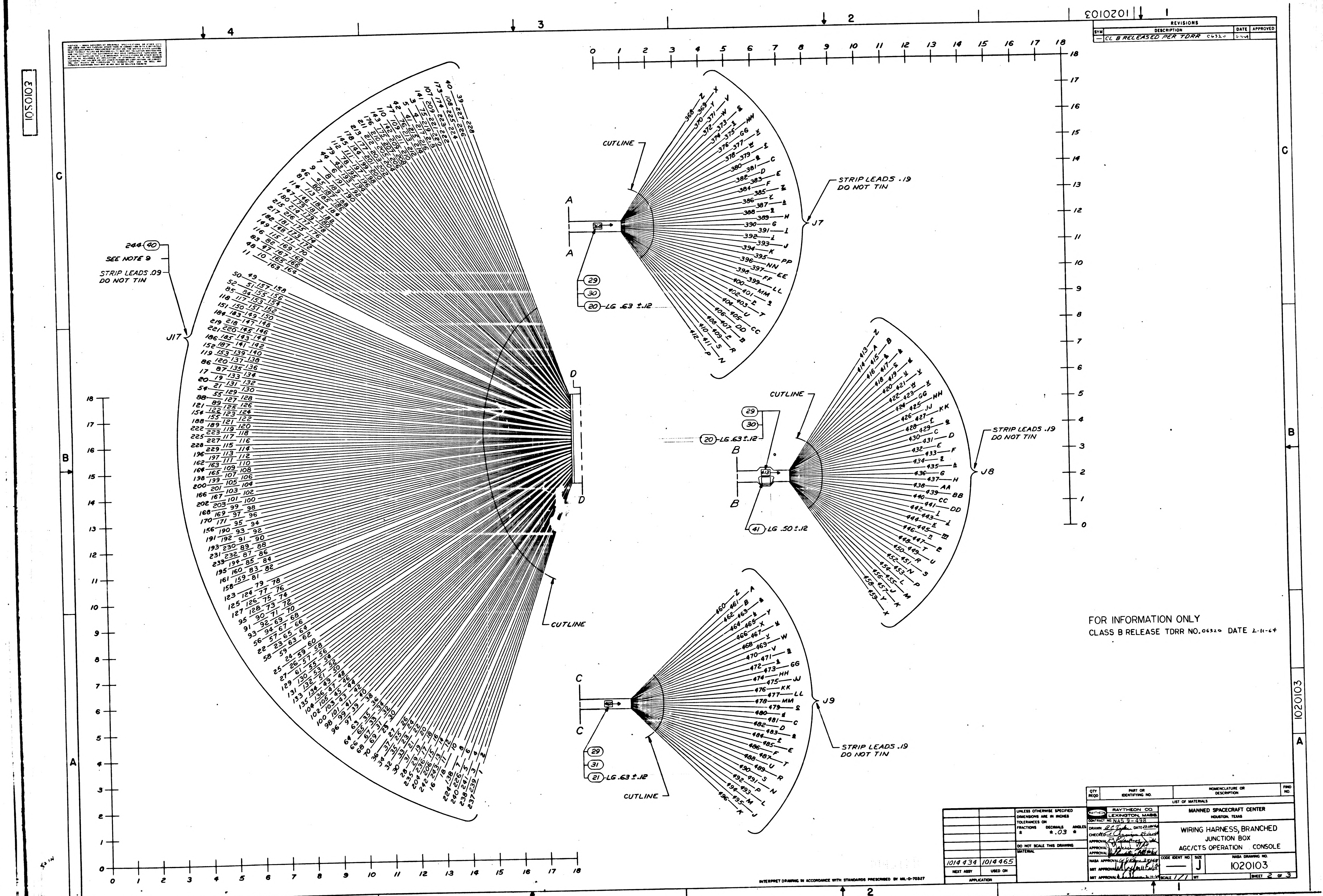
SH1	SH2	SH3
—	—	—

REV STATUS OF SHEETS

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020103

INCHES
PHOTOGRAPHIC SCALE ONLY



1020103
CUTLINE
STRIP LEADS .19
DO NOT TIN
J7
A
A
29
30
20 LG .63 ±.12
244 (40)
SEE NOTE 9
STRIP LEADS .09
DO NOT TIN
J17
D
D
CUTLINE
B
B
29
30
20 LG .63 ±.12
41 LG .50 ±.12
STRIP LEADS .19
DO NOT TIN
J8
C
C
29
31
21 LG .63 ±.12
CUTLINE
STRIP LEADS .19
DO NOT TIN
J9

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2-11-64

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06320	2-11-64	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014434	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Tucker DATE 23 JAN 64
CHECKED 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-7-64
MIT APPROVAL
MIT APPROVAL 2-10-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020103
SCALE 1/1 WT
SHEET 2 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR 0320	2-11-64	

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	228	BLK	22	23	357	
* *	358	BLK	22	23	225	
* *	357	BLK	22	23	245	
	224	ORN	22	24	359	
* *	359	ORN	22	24	243	
	226	WHT/RED	22	27	360	
* *	360	WHT/RED	22	27	241	
	227	BRN	22	25	361	
* *	361	BRN	22	25	239	
ATTACH FIND NO.23LG5.0	223	SHLD			356	* * ATTACH FIND NO 23 LG 2.0
* *	301	WHT	22	22	222	
	221	↕	↕	↕	300	* *
* *	299				220	
	219	WHT	22	22	298	* *
	314	WHT	22	26	218	
* *	315	BLK			217	
* *	314	WHT	22	22	257	
	216	WHT	22	26	312	
	215	BLK			313	
* *	312	WHT	22	22	260	
	310	WHT	22	26	214	
* *	311	BLK			213	* *
* *	310	WHT	22	22	203	
	212	WHT	22	26	308	
	211	BLK			309	* *
* *	308	WHT	22	22	266	
	306	WHT	22	26	210	
* *	307	BLK			209	
* *	306	WHT	22	22	269	
	208	WHT	22	26	304	
	207	BLK			305	* *
* *	304	WHT	22	22	272	
	302	WHT	22	26	206	
* *	303	BLK			205	
* *	302	WHT	22	22	275	
	204	WHT	22	26	316	
	203	BLK			317	* *
* *	316	WHT	22	22	254	
	318	WHT	22	26	202	
* *	319	BLK			201	
* *	318	WHT	22	22	251	
	200	WHT	22	26	320	
	199	BLK			321	* *
* *	320	WHT	22	22	249	
	322	WHT	22	26	198	
* *	323	BLK			197	
* *	322	WHT	22	22	247	
	196	WHT	22	26	324	
	195	BLK			325	* *
* *	324	WHT	22	22	244	
	326	WHT	22	26	194	
* *	327	BLK			193	
* *	326	WHT	22	22	242	
	192	WHT	22	26	328	
	191	BLK			329	* *
* *	328	WHT	22	22	240	
	342	WHT	22	26	190	
* *	343	BLK			189	
* *	342	WHT	22	22	259	
	188	WHT	22	26	340	
	187	BLK			341	* *
* *	340	WHT	22	22	262	
	338	WHT	22	26	186	
* *	339	BLK			185	
* *	338	WHT	22	22	265	
	184	WHT	22	26	336	
	183	BLK			337	* *
* *	336	WHT	22	22	268	
	334	WHT	22	26	182	
* *	335	BLK			181	
* *	334	WHT	22	22	271	
	180	WHT	22	26	332	
	179	BLK			333	* *
* *	332	WHT	22	22	274	
	330	WHT	22	26	178	
* *	331	BLK			177	
* *	330	WHT	22	22	238	
	176	WHT	22	26	344	
	175	BLK			345	* *
* *	344	WHT	22	22	256	
	346	WHT	22	26	174	
* *	347	BLK			173	
* *	346	WHT	22	22	253	
	172	WHT	22	26	348	
	171	BLK			349	* *
* *	348	WHT	22	22	250	
	350	WHT	22	26	170	
* *	351	BLK			169	
* *	350	WHT	22	22	248	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	168	WHT	22	26	352	
	167	BLK			353	* *
* *	352	WHT	22	22	246	
	354	WHT	22	26	166	
* *	355	BLK			165	
* *	354	WHT	22	22	237	
	164	WHT	22	26	295	* *
	163	BLK			296	* *
	287	WHT	22	26	158	
* *	288	BLK			157	
* *	287	WHT	22	22	261	
	156	WHT	22	26	293	
	155	BLK			294	* *
* *	293	WHT	22	22	252	
	285	WHT	22	26	154	
* *	286	BLK			153	
* *	285	WHT	22	22	264	
	152	WHT	22	26	283	
	151	BLK			284	* *
* *	283	WHT	22	22	267	
	281	WHT	22	26	150	
* *	282	BLK			149	
* *	281	WHT	22	22	270	
	148	WHT	22	26	219	
	147	BLK			280	* *
* *	279	WHT	22	22	273	
	277	WHT	22	26	146	
* *	278	BLK			145	
* *	277	WHT	22	22	276	
	144	WHT	22	26	289	
	143	BLK			290	* *
* *	289	WHT	22	22	255	
	291	WHT	22	26	142	
* *	292	BLK			141	
* *	291	WHT	22	22	258	
ATTACH FIND NO. 23 LG 7.0	140	SHLD			297	* * ATTACH FIND NO.23 LG 2.0
	139	WHT	22	26	395	
	138	BLK			396	
	405	WHT	22	26	137	
	406	BLK			136	
	135	WHT	22	26	371	
	134	BLK			372	
	411	WHT	22	26	133	
	412	BLK			132	
	131	WHT	22	26	409	
	130	BLK			410	
	403	WHT	22	26	129	
	404	BLK			128	
	127	WHT	22	26	407	
	126	BLK			408	
	399	WHT	22	26	125	
	400	BLK			124	
	123	WHT	22	26	397	
	122	BLK			398	
	401	WHT	22	26	121	
	402	BLK			120	
	119	WHT	22	26	373	
	118	BLK			374	
	375	WHT	22	26	117	
	376	BLK			116	
	115	WHT	22	26	369	
	114	BLK			370	
	379	WHT	22	26	113	
	380	BLK			112	
	111	WHT	22	26	389	
	110	BLK			390	
	393	WHT	22	26	109	
	394	BLK			108	
	107	WHT	22	26	377	
	106	BLK			378	
	385	WHT	22	26	105	
	386	BLK			104	
	103	WHT	22	26	391	
	102	BLK			392	
	387	WHT	22	26	101	
	388	BLK			100	
	99	WHT	22	26	381	
	98	BLK			382	
	383	WHT	22	26	97	
	384	BLK			96	
ATTACH FIND NO.23 LG 6.5	95	SHLD			368	ATTACH FIND NO.23LG 2.5
	94	WHT	22	26	495	
	93	BLK			496	
	493	WHT	22	26	92	
	494	BLK			91	
	90	WHT	22	26	465	
	89	BLK			466	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	471	WHT	22	26	88	
	472	BLK			87	
	86	WHT	22	26	491	
	85	BLK			492	
	470	WHT	22	26	84	
	469	BLK			83	
	82	WHT	22	26	477	
	81	BLK			478	
	489	WHT	22	26	79	
	490	BLK			78	
	77	WHT	22	26	487	
	76	BLK			488	
	467	WHT	22	26	75	
	468	BLK			74	
	72	WHT	22	26	463	
	73	BLK			464	
	479	WHT	22	26	71	
	480	BLK			70	
	69	WHT	22	26	483	
	68	BLK			484	
	461	WHT	22	26	67	
	462	BLK			66	
	56	WHT	22	26	473	
	64	BLK			474	
	475	WHT	22	26	62	
	476	BLK			63	
	60	WHT	22	26	481	
	59	BLK			482	
	485	WHT	22	26	58	
	486	BLK			57	
ATTACH FIND NO.23LG 6.0	65	SHLD			460	ATTACH FIND NO.23LG 2.5
	55	WHT	22	26	436	
	54	BLK			437	
	416	WHT	22	26	53	
	417	BLK			52	
	51	WHT	22	26	418	
	50	BLK			419	
	422	WHT	22	26	49	
	423	BLK			48	
	47	WHT	22	26	444	
	46	BLK			445	
	442	WHT	22	26	45	
	443	BLK			44	
	43	WHT	22	26	446	
	42	BLK			447	
	450	WHT	22	26	41	
	451	BLK			40	
	39	WHT	22	26	428	
	38	BLK			429	
	440	WHT	22	22	35	
	36	BLK	22	23	362	* *
	34	WHT	22	26	439	
	33	BLK			438	
	427	WHT	22	26	32	
	426	BLK			31	
	30	WHT	22	26	425	
	29	BLK			424	
	432	WHT	22	26	27	
	433	BLK			26	
	25	WHT	22	26	430	
	24	BLK			431	
	452	WHT	22	26	23	
	453	BLK			22	
	21	WHT	22	26	454	
	20	BLK			455	
	456	WHT	22	26	19	
	457	BLK			18	
	17	WHT	22	26	414	
	16	BLK			415	
	421	WHT	22	26	15	
	420	BLK			14	
	13	WHT	22	26	434	
	12	BLK			435	
	448	WHT	22	26	11	
	449	BLK			10	
ATTACH FIND NO. 23 LG 6.5	8	SHLD			413	ATTACH FIND NO.23LG 2.5
	7	WHT	22	28	366	
	6	BLK			364	
		SHLD			362	ATTACH FIND NO.23LG 4.0
* *	366	WHT	22	28	236	
* *	364	BLK			235	
ATTACH FIND NO.23 LG 4.0 * *	362	SHLD			234	ATTACH FIND NO.23 LG 3.0
* *	367	WHT	22	28	459	
* *	365	BLK			458	
ATTACH FIND NO.23 LG 4.8 * *	363	SHLD				
	5	WHT	22	26	229	
	4	BLK			230	
	3	WHT	22	26	232	
	2	BLK			231	
ATTACH FIND NO. 23 LG 8.0	1	SHLD			233	ATTACH FIND NO. 23 LG 3.0

0320 2/11/64

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0320 DATE 2-11-64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
1019934	1014465
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.2 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO ——— SIZE J NASA DRAWING NO 1020103
SCALE NONE WT SHEET 3 OF 3

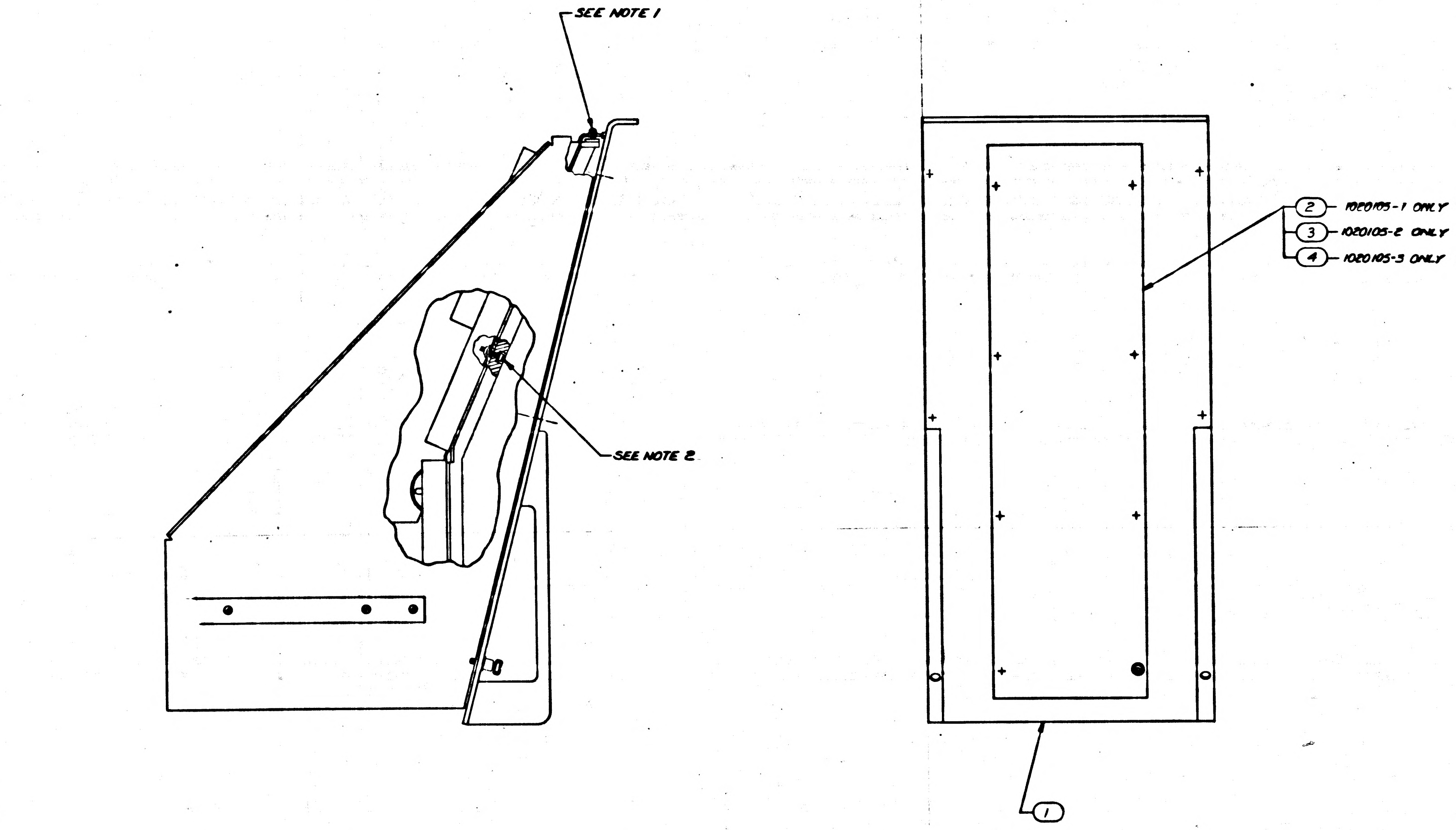
1020103

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05555	31 Dec 63	
A	CHANGED PER TDRR 12324 DR CHK APPD	16 SEP 64	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05555 DATE 31 Dec 63

NOTES:
1. APPLY PRESSURE TO RFI GASKET
2. MTG HDWR AS SUPPLIED IN FIND 2, 8 PLACES

QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	—	—	1003706	AGC KEYBOARD & DISPLAY ASSY	4
—	1	—	1003458	AGC KEYBOARD & DISPLAY ASSY	3
—	—	1	1003524	AGC KEYBOARD & DISPLAY ASSY	2
1	1	1	1014334	MOUNTING FIXTURE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020015	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H.C. Taylor DATE 5 DEC 63
CHECKED T. Dunn
APPROVAL C. Snyder
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 31 Dec 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020105
SCALE 1/2
WT
SHEET 1 OF 1

1020105

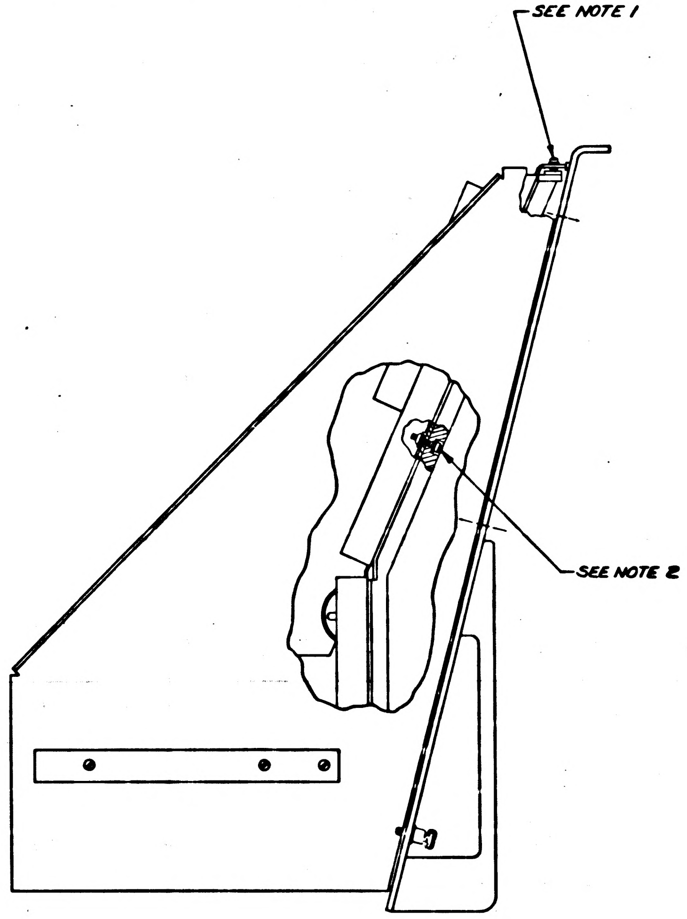
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

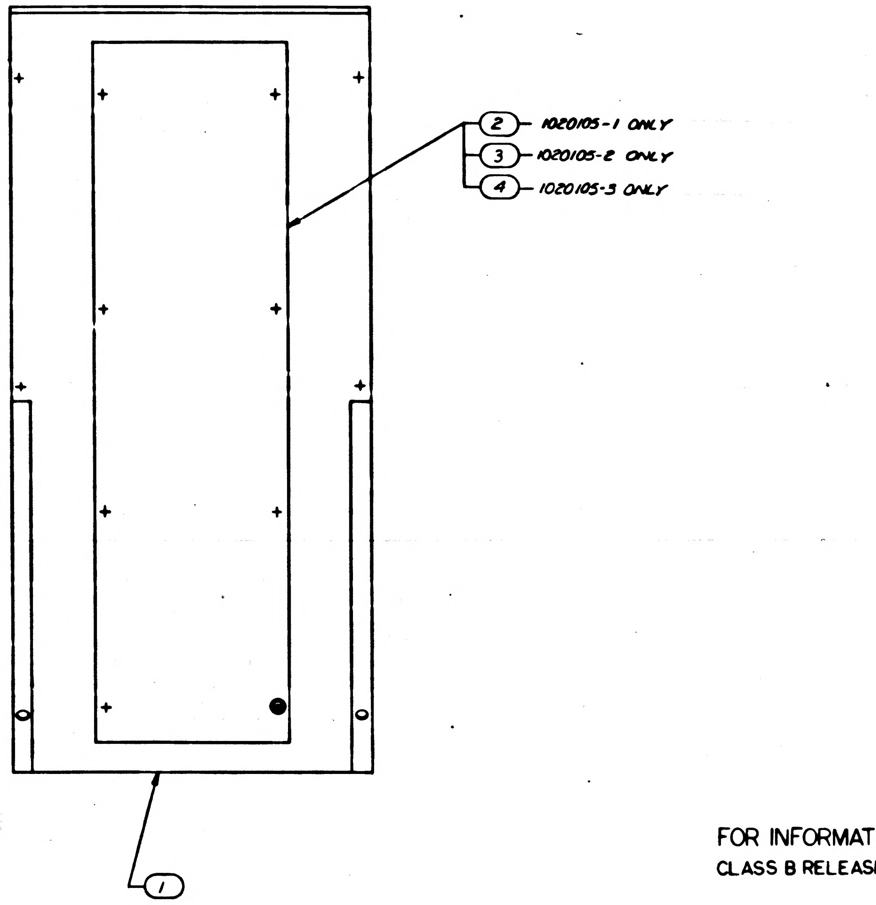
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05555	31 Dec 63	WK
A	CHANGED - PER TDRR 12324 DR R. CHK APPD	16 SEP 64	KES
B	REPLACED WITH CHANGES BY REV C PER TDRR 16295 DR J.P. Leonard CHK APPD	11 MAR 65	KES





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05555 DATE 31 Dec 63

Ⓑ REPLACED WITH CHANGE BY REV C

NOTES:
1. APPLY PRESSURE TO RFI GASKET
2. MTG HDWR AS SUPPLIED IN FIND 2, 8 PLACES

QTY REQD	QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	—	—	1003706	AGC KEYBOARD & DISPLAY ASSY	4
—	1	—	1003458	AGC KEYBOARD & DISPLAY ASSY	3
—	—	1	1003524	AGC KEYBOARD & DISPLAY ASSY	2
1	1	1	1014334	MOUNTING FIXTURE ASSY	1
-3	-2	-1	LIST OF MATERIALS		

NEXT ASSY	USED ON
1020015	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-49E
DRAWN R.C. Taylor DATE 5 DEC 63
CHECKED T. Dinwoodie 18 DEC 63
APPROVAL C. Searley 12/18
APPROVAL 12/18
APPROVAL
NASA APPROVAL
MIT APPROVAL W K 31 Dec 63
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020105
SCALE 1/2
WT
SHEET 1 OF 1

1020105

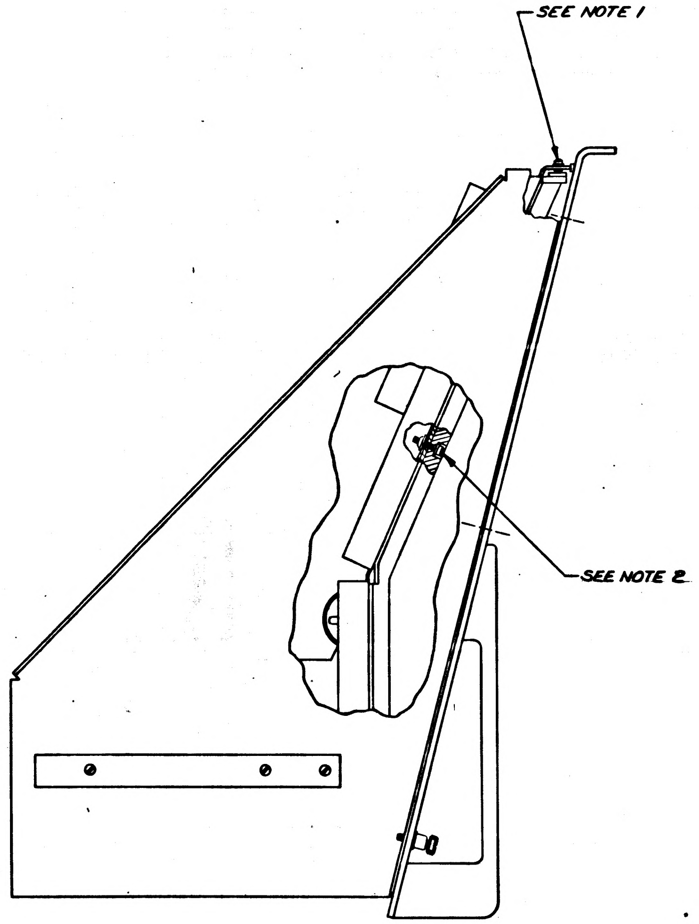
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

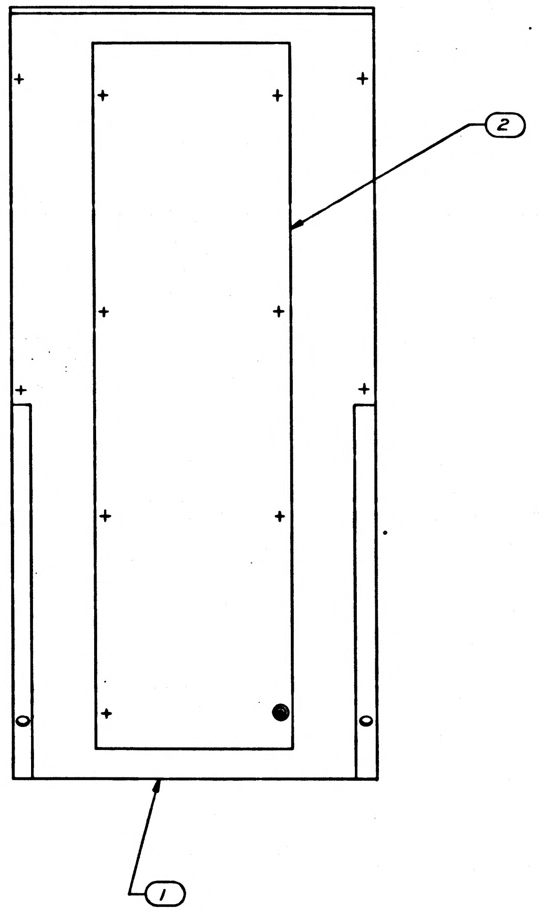
ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05555	31 Dec 63	WH





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05555 DATE 31 Dec 63

NOTES:
1. APPLY PRESSURE TO RFI GASKET
2. MTG HDWR AS SUPPLIED IN FIND 2, 8 PLACES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1003524	AGC KEYBOARD & DISPLAY ASSY	2
1	1014334	MOUNTING FIXTURE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020015	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN A.C. Taylor DATE 5 Dec 63
CHECKED I. Dunok 18 Dec 63
APPROVAL C Sarlin JPK
APPROVAL [illegible] 12/18
APPROVAL [illegible] 12/19/63
NASA APPROVAL [illegible]
MIT APPROVAL W [illegible] 31 Dec 63
MIT APPROVAL [illegible] 12-30-63

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020105
SCALE 1/2 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

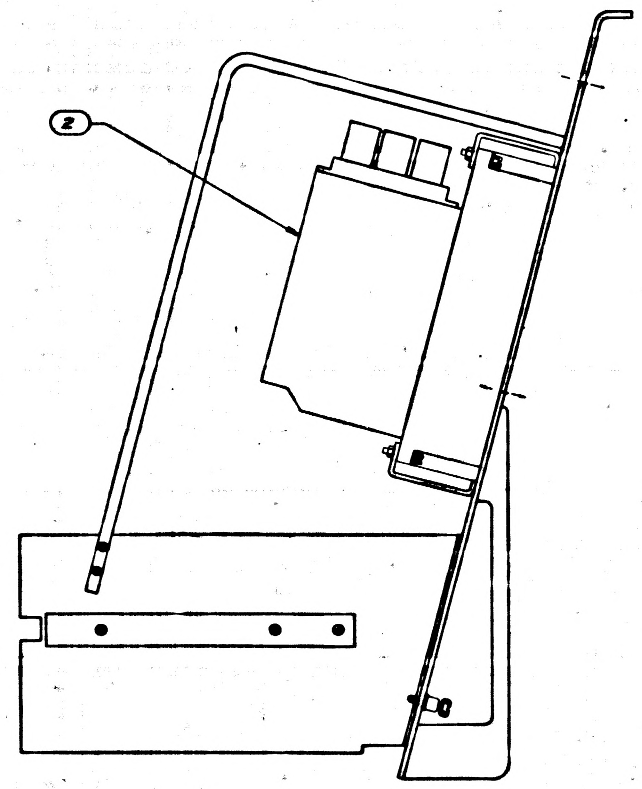
1020105

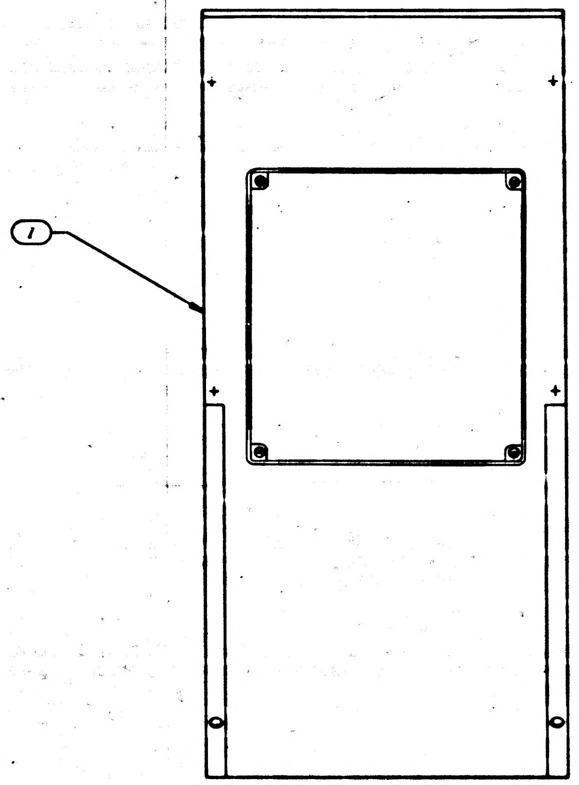
INCHES
PHOTOGRAPHIC SCALE ONLY

[illegible]

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761	1/14/64	
A	CHANGED PER TDRR 08115 W. Dunn CHKD Coggin APPD	11 MAY 64	KEB





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1/14/64

~~NOTES:~~
~~1. TO ASSEMBLE FIND 1 AND FIND 2 REMOVE CAPTIVE HARDWARE IN FIND 2,~~
~~BAG AND TAG, TO REMAIN DISASSEMBLED UNTIL REQUIRED.~~
~~2. #10 HDWR SUPPLIED IN FIND 1, 4 PLACES.~~

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1003540	MAIN KEYBOARD & DISPLAY	2
1	1014377	MOUNTING FIXTURE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020014	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4065
DRAWN R.C. Taylor DATE 5 DEC 63
CHECKED T. Dunn 18 DEC 63
APPROVAL C. Sperling
APPROVAL
W. Dunn 1 Jan 64
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MAIN DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020106
SCALE 1/2
WT
SHEET 1 OF 1

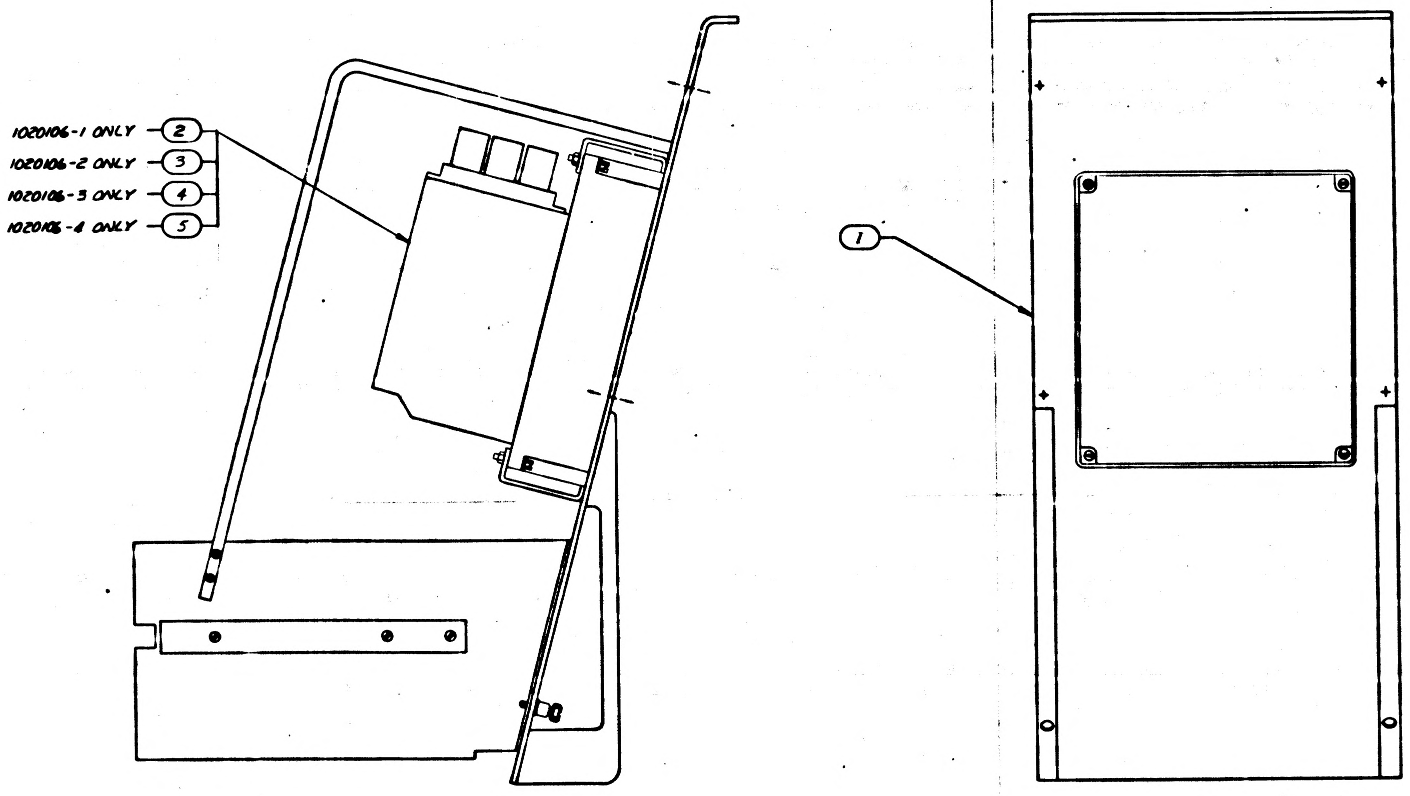
1020106

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761		
A	CHANGED PER TDRR 08115 W. Dunn CHK APP	11 MAY 64	KSB
B	CHANGED PER TDRR 12324 DR. R. CHK APPD	10 SEPT 64	KD



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE

~~NOTES:~~
~~1. TO ASSEMBLE FIND 1 AND FIND 2 REMOVE CAPTIVE HARDWARE IN FIND 2,~~
~~BAG AND TAG, TO REMAIN DISASSEMBLED UNTIL REQUIRED~~
~~2. MTG HDWR SUPPLIED IN FIND 1, 4 PLACES~~

1020106

QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	—	—	—	1003755	MAIN KEYBOARD & DISPLAY ASSY	5
—	1	—	—	1003707	MAIN KEYBOARD & DISPLAY ASSY	4
—	—	1	—	1003459	MAIN KEYBOARD & DISPLAY ASSY	3
—	—	—	1	1003 40	MAIN KEYBOARD & DISPLAY	2
1	1	1	1	1014377	MOUNTING FIXTURE ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020014	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R. C. Taylor DATE 5 DEC 63
CHECKED 10 DEC 63
APPROVAL
APPROVAL
Jan 64
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL D.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MAIN DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020106
SCALE 1/2
WT
SHEET 1 OF 1

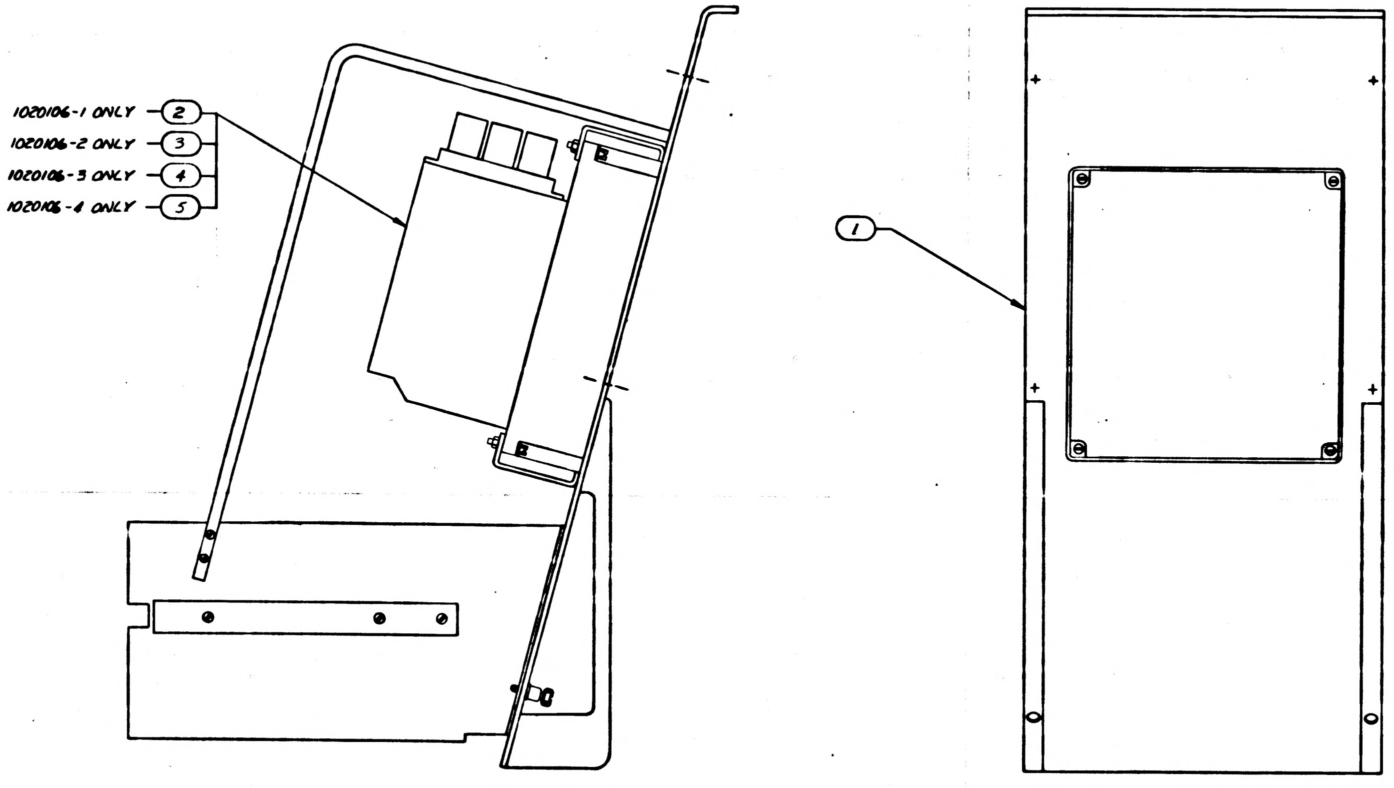
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761		
A	CHANGED PER TDRR 08115 W. Dunn CHK A Cygan APPD	11 MAY 64	
B	CHANGED PER TDRR 12324 DR R CHK APPD	15 SEP 64	
C	REPLACED WITH CHANGES BY REV D PER TDRR 16295 DR CHK APPD	11 MAR 65	



~~NOTES~~

~~1. TO ASSEMBLE FIND 1 AND FIND 2 REMOVE CAPTIVE HARDWARE IN FIND 2, BAG AND TAG, TO REMAIN DISASSEMBLED UNTIL REQUIRED~~

~~2. MTG HDWR SUPPLIED IN FIND 1, 4 PLACES~~

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 05761 DATE

ⒸREPLACED WITH CHANGE BY REV D

1	—	—	—	1003755	MAIN KEYBOARD & DISPLAY ASSY	5
—	1	—	—	1003707	MAIN KEYBOARD & DISPLAY ASSY	4
—	—	1	—	1003459	MAIN KEYBOARD & DISPLAY ASSY	3
—	—	—	1	1003540	MAIN KEYBOARD & DISPLAY	2
1	1	1	1	1014377	MOUNTING FIXTURE ASSY	1
QTY REQD	QTY REQD	QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-4	-3	-2	-1	LIST OF MATERIALS		

NEXT ASSY	USED ON
1020014	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 5 DEC 63
CHECKED 10 DEC 63
APPROVAL
APPROVAL
Jan 64
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MAIN DISPLAY
TO FIXTURE ASSY

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020106
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

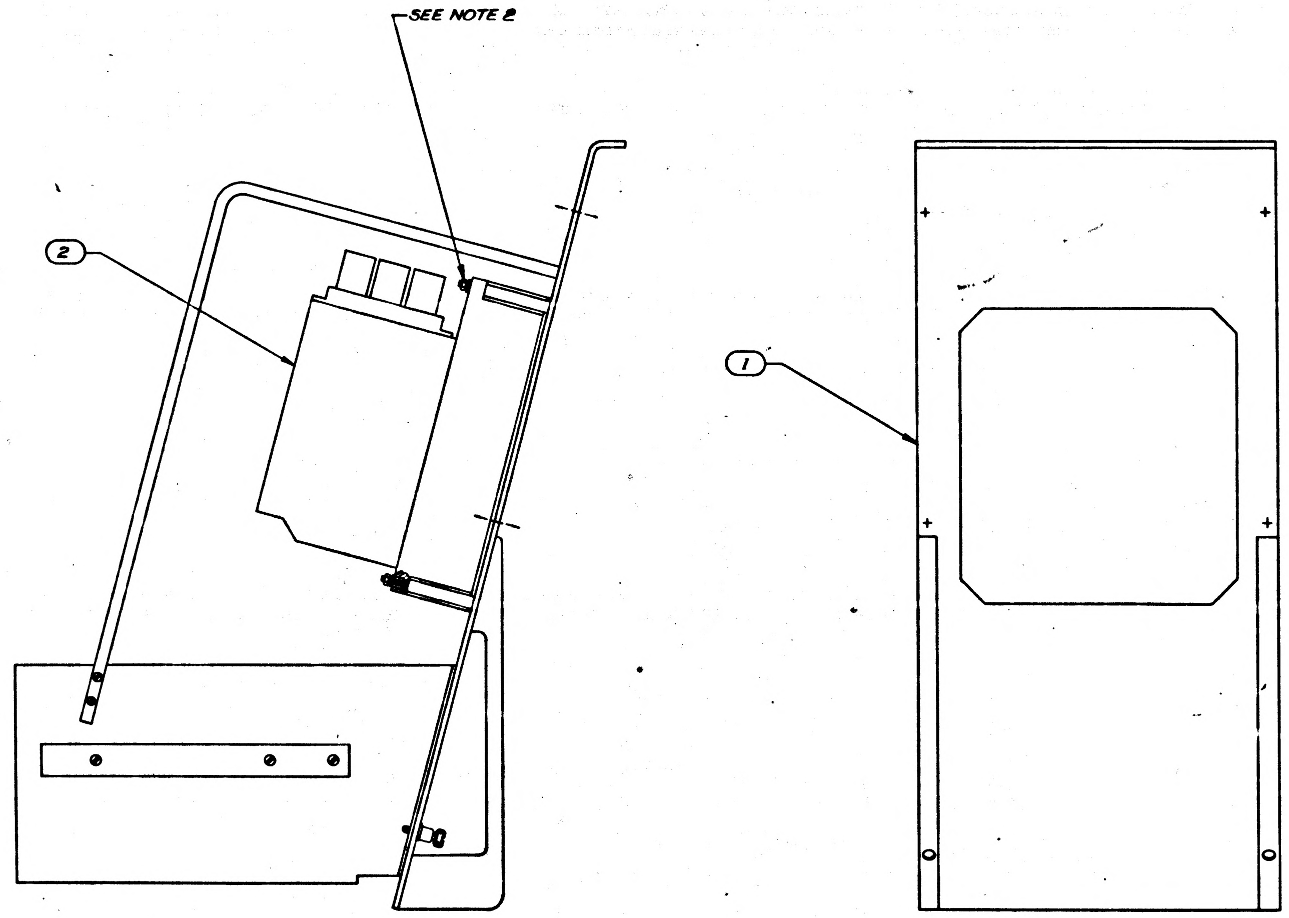
1020106

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761	1/14/64	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1/14/64

NOTES
1. TO ASSEMBLE FIND 1 AND FIND 2 REMOVE CAPTIVE HARDWARE IN FIND 2, BAG AND TAG, TO REMAIN DISASSEMBLED UNTIL REQUIRED
2. MTG HDWR SUPPLIED IN FIND 1, 4 PLACES

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1003540	MAIN KEYBOARD & DISPLAY	2
1	1014377	MOUNTING FIXTURE ASSY	1

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NEXT ASSY	USED ON
1020014	1020002
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

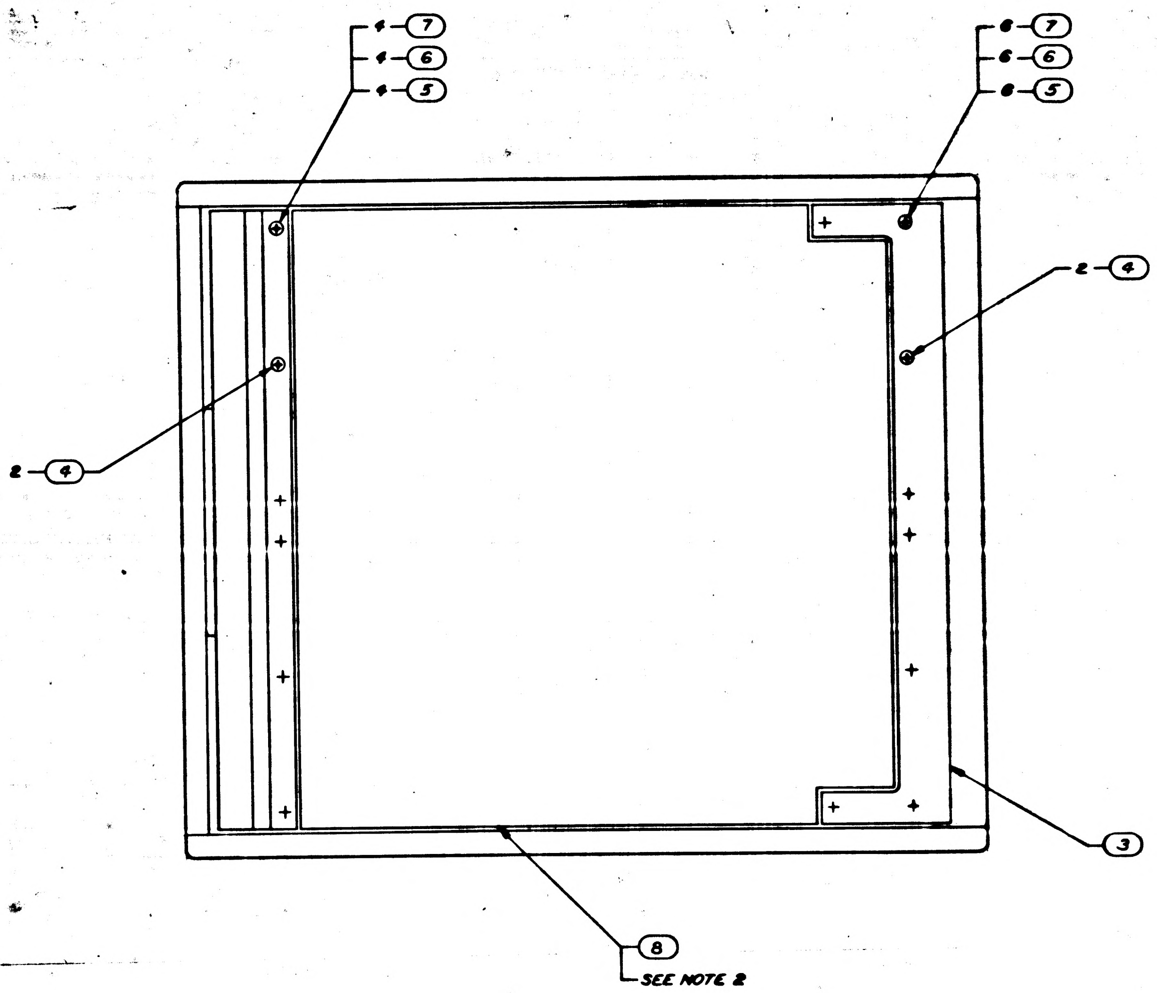
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE 5 DEC 63
CHECKED 18 DEC 63
APPROVAL
APPROVAL
1 Jan 64
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

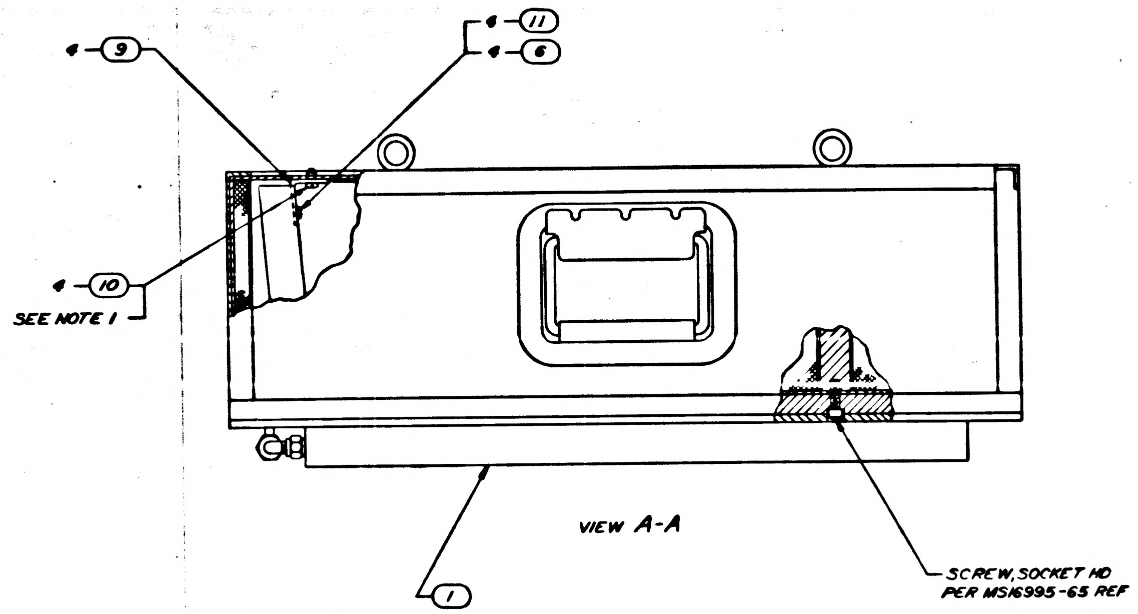
MAIN DISPLAY
TO FIXTURE ASSY

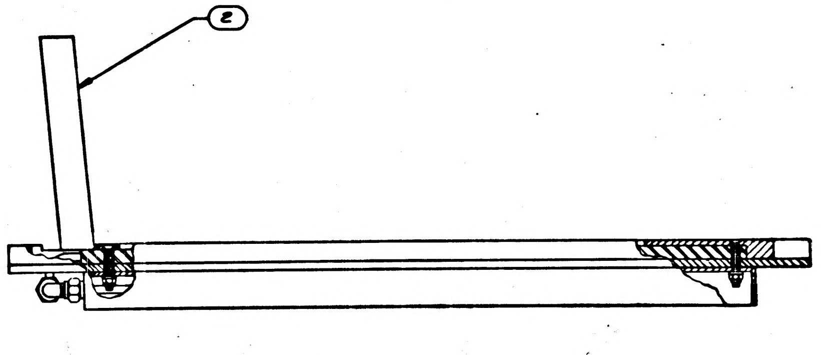
CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	F	1020106
SCALE 1/2	WT	SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761	1-14-6	
A	CHANGED PER TDRR 08125 DR. W.B. CHKD. L.C. APPD.	12 MAY 69	KB

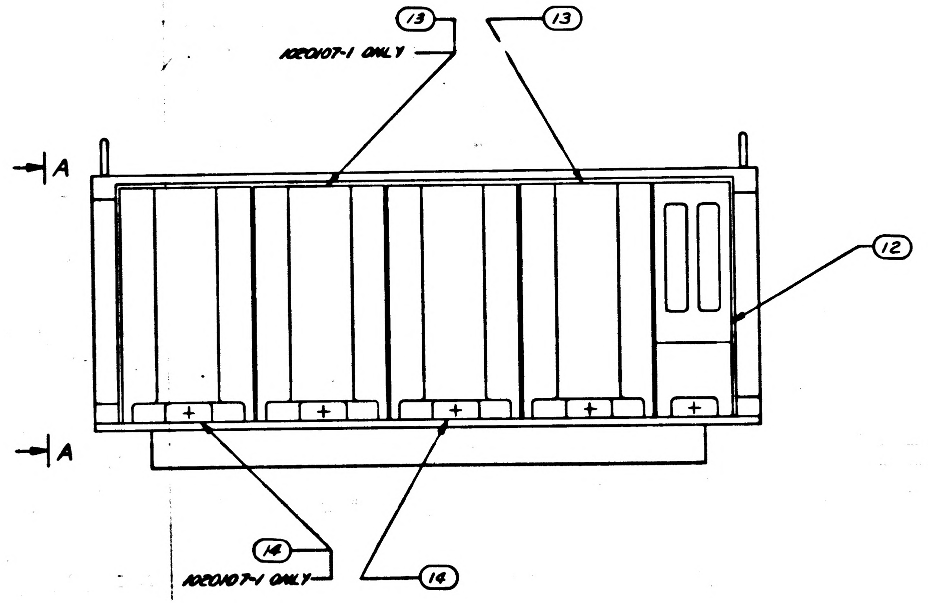


VIEW SHOWN WITH COVER REMOVED





VIEW SHOWN WITH COVER REMOVED



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1-14-6

NOTES:
1. ASSEMBLE FIND NO. 10 USING FIND NO. 15
2. ASSEMBLE FIND NO. 8 USING FIND NO. 16 PER ND
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. FIND NO. 8 IS GOV'T FURNISHED MATL. (THERMAL INTERFACE, NORTH AMERICAN AVIATION PART NO.)
5. FIND NO. 17, 18 & 19 TO BE PKGD & MARKED PER ND1002019

ORDER OF ASSY
1. REMOVE COVER OF FIND 1
2. INSTALL FIND 2, FIND 3 & FIND 8 AS SHOWN
3. REPLACE COVER
4. INSTALL (4) FIND 9 AS SHOWN
5. INSTALL FIND 12, FIND 13 & FIND 14

1020107-2	A
1020107-1	A
PART NO.	REV SYM
REVISION STATUS OF ASSYS	

NOT SHOWN SEE NOTE 5 (FIND 17, 18, 19)

SEE NOTE 4 (FIND 8)

QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
14	14	1010630-58	SCREW, FLAT HD HEX SOC	19
4	4	1015836-296	SCREW, HEX HD	18
4	4	1015836-292	SCREW, HEX HD	17
A/R	A/R	1006879	THERMAL COND PASTE	16
A/R	A/R	MIL-S-40083-CL31	SEALING COMPOUND	15
1	2	1003184	MEMORY TRAY B	14
1	2	1003187	LOGIC TRAY A	13
1	1	1003197	G & N HARNESS TRAY	12
4	4	MS35234-62	SCREW, MACH, PAN HD, SLOTTED	11
4	4	MS35234-60	SCREW, MACH, PAN HD, SLOTTED	10
4	4	1004272	BRACKET	9
1	1	G25-820518-31	CARRIER TUBE ASSY	8
10	10	MS21044-C3	NUT, SELF-LOCKING	7
14	14	MS15795-308	WASHER, PLAIN FLAT	6
10	10	MS35201-60	SCREW, MACH, FLAT CSK HD	5
4	4	MS35201-55	SCREW, MACH, FLAT CSK HD	4
1	1	1003180	TOE PLATE	3
1	1	1003189	END CONNECTOR ASSY	2
1	1	1020001	HANDLING FIX. AGC	1

LIST OF MATERIALS

1020018	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4065
DRAWN R.C. Taylor DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
GOVT APPROVAL
GOVT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

AGC TO HANDLING FIXTURE ASSY

CODE IDENT NO. —
SIZE J
DRAWING NO. 1020107
SCALE 1/2
WT
SHEET 1 OF 1

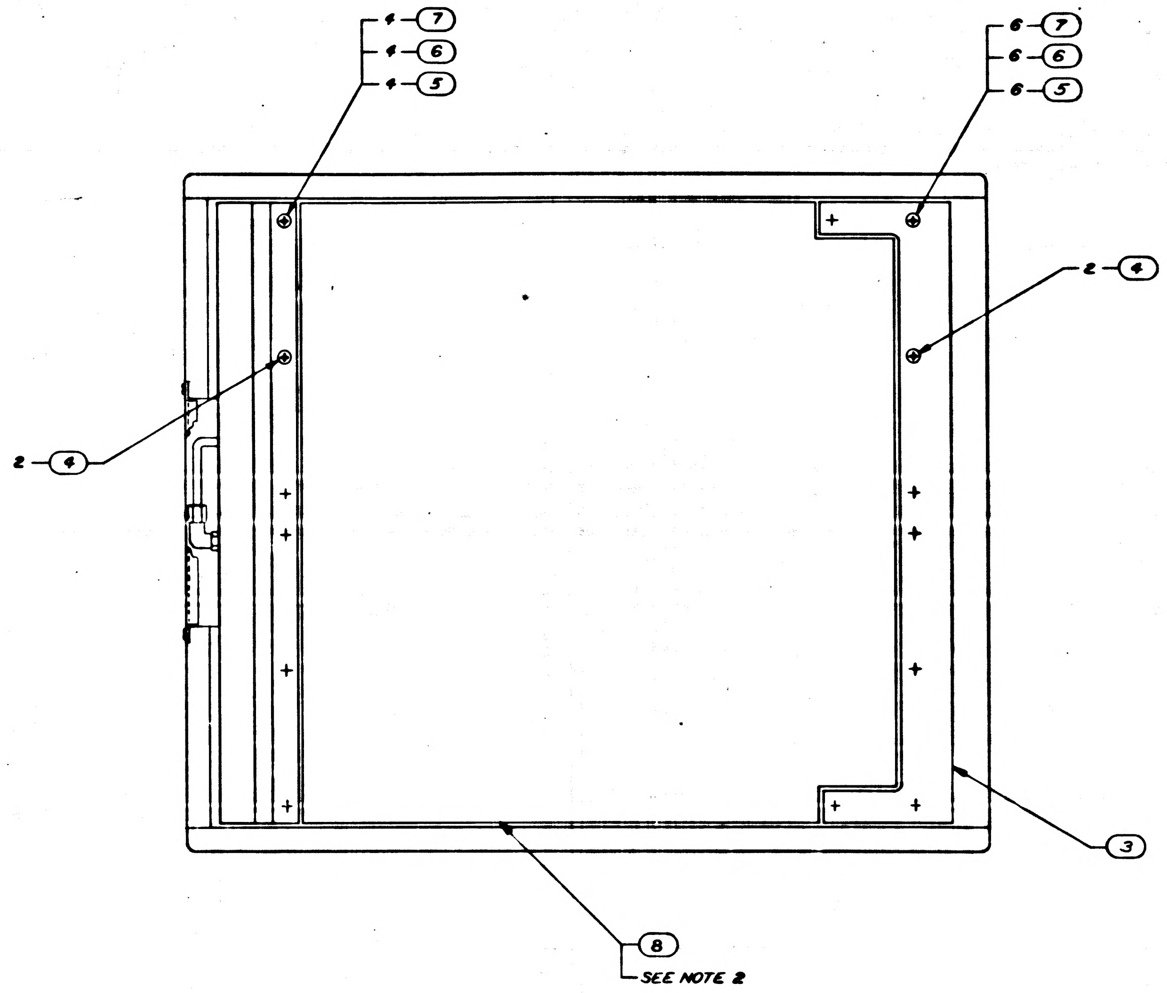
1020107

[illegible]

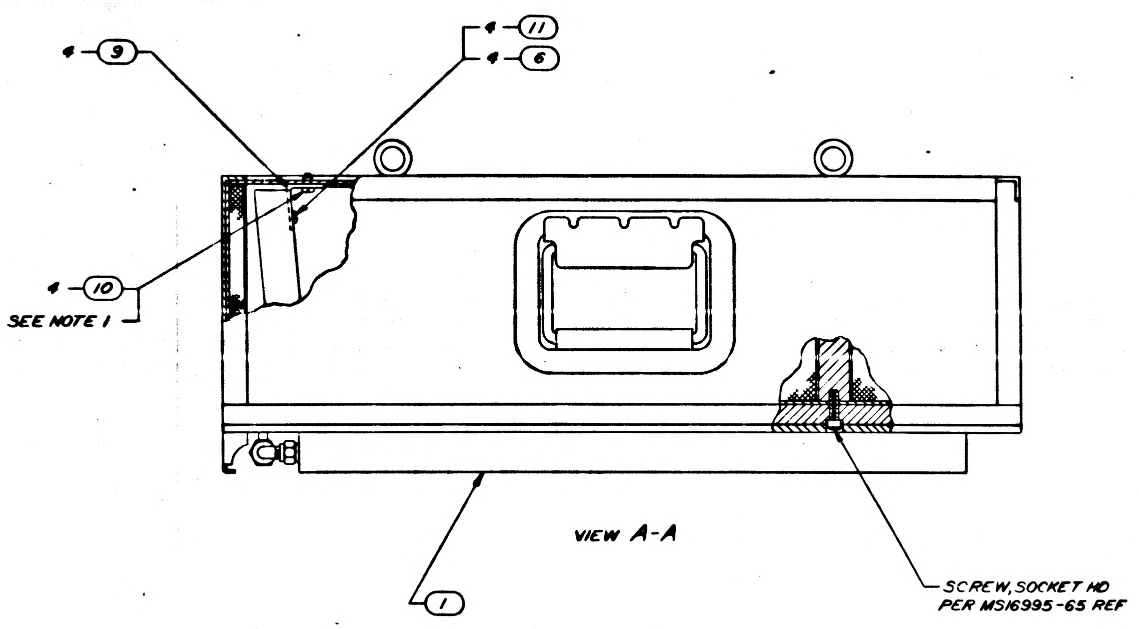
1020107

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 05761	1/14/69	
A	CHANGED PER TDRR 08125 DR. [illegible] CHK [illegible] APPD [illegible]	12 MAR 69	KCB
B	CHANGED PER TDRR 09779 DR [illegible] CHK [illegible] APP [illegible]	16 Jun 69	KCB

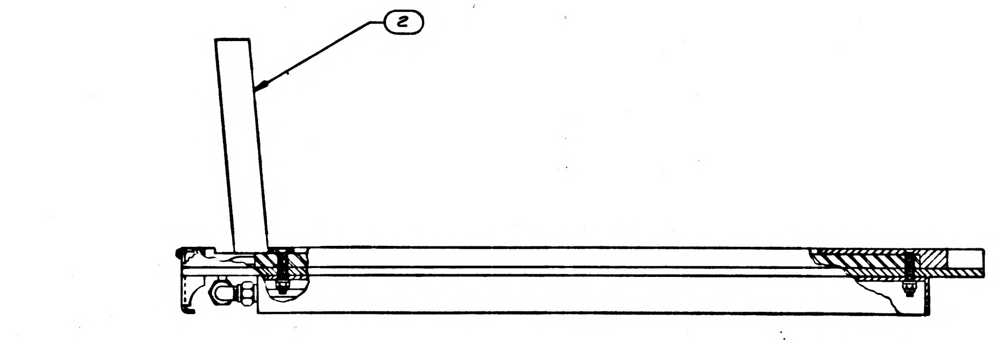
REVISIONS



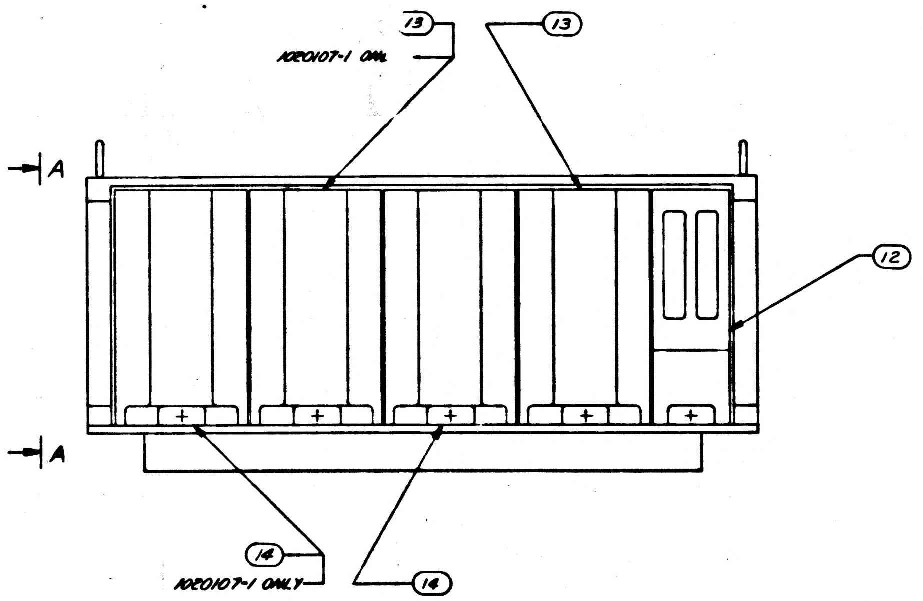
VIEW SHOWN WITH COVER REMOVED



VIEW A-A



VIEW SHOWN WITH COVER REMOVED



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1/14/69

NOTES:

1. ASSEMBLE FIND NO. 10 USING FIND NO. 15
2. ASSEMBLE FIND NO. 8 USING FIND NO. 16 PER ND
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. FIND NO. 8 IS GOV'T FURNISHED MATL. (THERMAL INTERFACE, NORTH AMERICAN AVIATION PART NO.)
5. FIND NO. 17, 18 & 19 TO BE PKGD & MARKED PER ND1002019

ORDER OF ASSY

1. REMOVE COVER OF FIND 1
2. INSTALL FIND 2, FIND 3 & FIND 8 AS SHOWN
3. REPLACE COVER
4. INSTALL (4) FIND 9 AS SHOWN
5. INSTALL FIND 12, FIND 13 & FIND 14

PART NO.	REV SYM
1020107-2	B
1020107-1	B

REVISION STATUS OF ASSYS

	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
NOT SHOWN SEE NOTE 5	19	19	1010630-58	SCREW, FLAT HD HEX SOC	19
	4	4	1015836-296	SCREW, HEX HD	18
	4	4	1015836-292	SCREW, HEX HD	17
	A/R	A/R	1006879	THERMAL COND PASTE	16
	A/R	A/R	MIL-S-40083-CL31	SEALING COMPOUND	15
	1	2	1003184	MEMORY TRAY B	14
	1	2	1003187	LOGIC TRAY A	13
	1	1	1003197	G&N HARNESS TRAY	12
	4	4	MS35234-62	SCREW, MACH, PAN HD, SLOTTED	11
	4	4	MS35234-60	SCREW, MACH, PAN HD, SLOTTED	10
	4	4	1004272	BRACKET	9
SEE NOTE 4	1	1	G25-820518-31	CARRIER TUBE ASSY	8
	10	10	MS21044-C3	NUT, SELF-LOCKING	7
	14	14	MS15795-308	WASHER, PLAIN FLAT	6
	10	10	MS35201-60	SCREW, MACH, FLAT CSK HD	5
	4	4	MS35201-55	SCREW, MACH, FLAT CSK HD	4
	1	1	1003180	TOE PLATE	3
	1	1	1003189	END CONNECTOR ASSY	2
	1	1	1020001	HANDLING FIX. AGC	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020012	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

AGC TO HANDLING FIXTURE ASSY

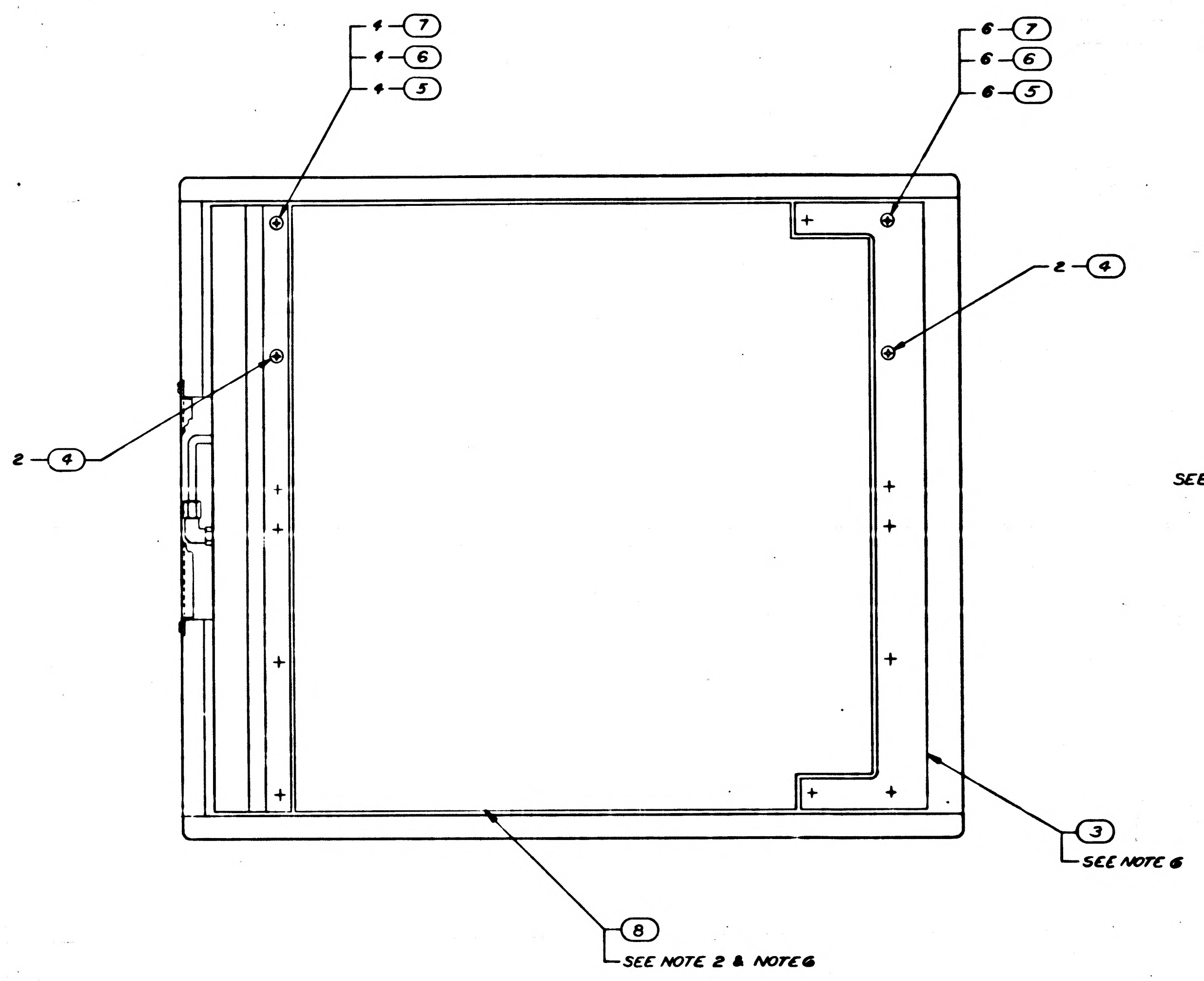
CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020107
SCALE 1/2 WT SHEET 1 OF 1

1020107

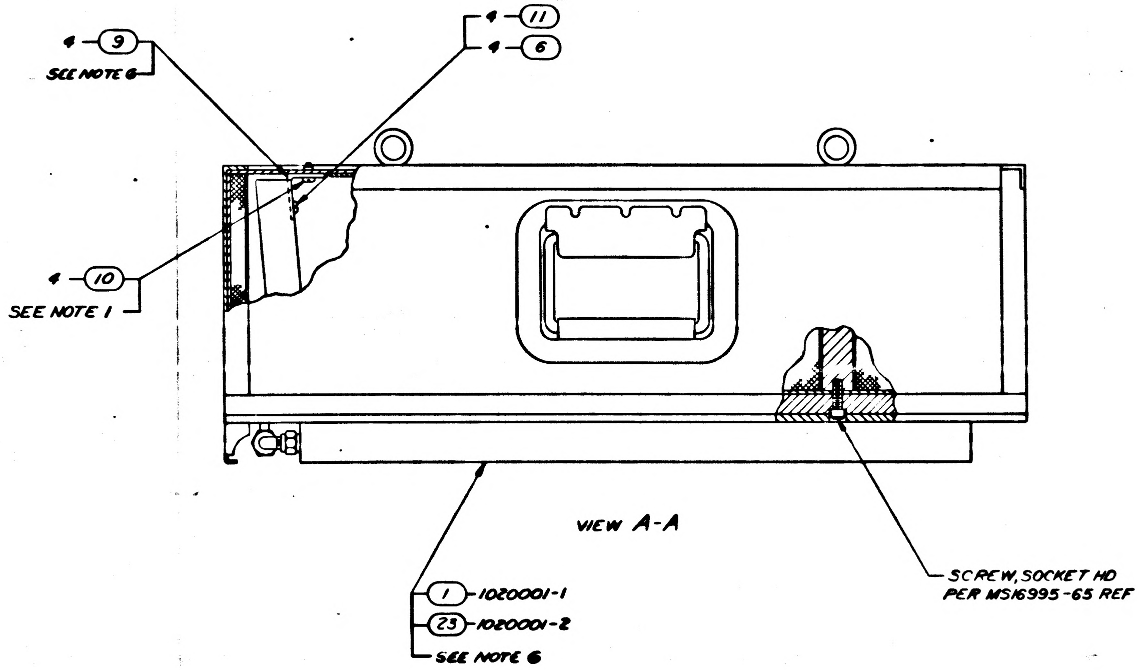
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

1020107

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	
A	CHANGED PER TDRR 08125 DR. W D CHK G.G.C APP	12 MAR 64	KB
B	CHANGED PER TDRR 09779 DR F CHK APP	16 Jun 64	KCB
C	CHANGED PER TDRR 12926 DR X CHK APP	14 OCT 64	KEB

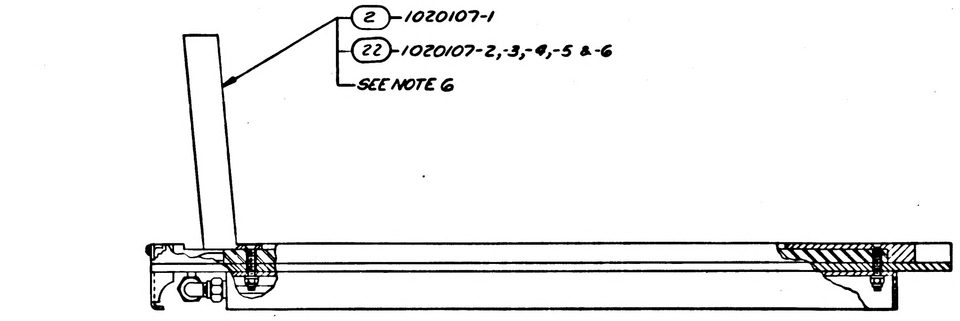


VIEW SHOWN WITH COVER REMOVED

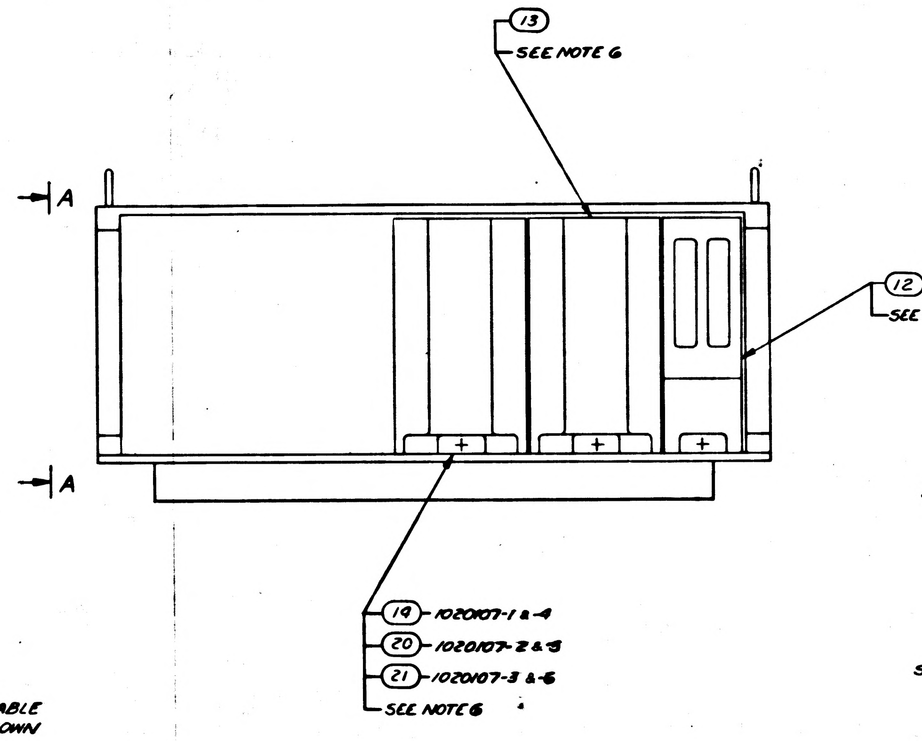


VIEW A-A

REV STATUS OF ASSYS	
PART NO.	REV SYM
1020107-1	C
1020107-2	C
1020107-3	C
1020107-4	C
1020107-5	C
1020107-6	C



VIEW SHOWN WITH COVER REMOVED



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1/4/64

	QTY REQD -6	QTY REQD -5	QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
							1020215	BLOCK DIAG, AGC HANDLING EQUIP	RE
*	1	1	1	—	—	—	1020001-2	HANDLING FIXTURE AGC	2
*	1	1	—	1	1	—	1003466	END CONNECTOR ASSY	2
*	1	—	—	1	—	—	1003476	MEMORY TRAY B	2
*	—	1	—	—	1	—	1003465	MEMORY TRAY B	20
NOT SHOWN SEE NOTE 5 *	14	14	14	14	14	14	1010630-58	SCREW, FLAT HD HEX SOC	1
NOT SHOWN SEE NOTE 5 *	4	4	4	4	4	4	AN104608	SCREW, HEX HD	1
NOT SHOWN SEE NOTE 5 *	4	4	4	4	4	4	AN109606	SCREW, HEX HD	1
	AR	AR	AR	AR	AR	AR	1006879	THERMAL COND PASTE	16
	AR	AR	AR	AR	AR	AR	MIL-S-40083-CL31	SEALING COMPOUND	15
*	—	—	1	—	—	1	1003184	MEMORY TRAY B	1
*	1	1	1	1	1	1	1003187	LOGIC TRAY A	1
*	1	1	1	1	1	1	1003197	G & N HARNESS TRAY	12
	4	4	4	4	4	4	MS35234-62	SCREW, MACH, PAN HD, SLOTTED	1
	4	4	4	4	4	4	MS35234-60	SCREW, MACH, PAN HD, SLOTTED	1
*	4	4	4	4	4	4	1004272	BRACKET	9
SEE NOTE 4 *	1	1	1	1	1	1	G25-820518-31	CARRIER TUBE ASSY	8
	10	10	10	10	10	10	MS21044-C3	NUT, SELF-LOCKING	7
	14	14	14	14	14	14	MS15795-808	WASHER, PLAIN FLAT	6
	10	10	10	10	10	10	MS24693-C278	SCREW, MACH, FLAT CSK HD	5
	4	4	4	4	4	4	MS24693-C272	SCREW, MACH, FLAT CSK HD	4
*	1	1	1	1	1	1	1003180	TOE PLATE	3
*	—	—	1	—	—	1	1003189	END CONNECTOR ASSY	2
*	—	—	—	1	1	1	1020001-1	~~HANDLING FIX. AGC~~	

LIST OF MATERIALS

* SEE NOTE 6

NOTES:

1. ASSEMBLE FIND NO. 10 USING FIND NO. 15
2. ASSEMBLE FIND NO. 8 USING FIND NO. 16 PER ND
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. FIND NO. 8 IS GOV'T FURNISHED MATL. (THERMAL INTERFACE, NORTH AMERICAN AVIATION PART NO.)
5. FIND NO. 17, 18 & 19 TO BE PKGD & MARKED PER ND1002019
6. DO NOT USE THIS DWG FOR PROCUREMENT OF FIND NO.'S 1, 2, 3, 8, 9, 12, 13, 14, 17, 18, 19, 20, 21, 22, & 23
7. SEE FAMILY TREE 1020016

ORDER OF ASSY

1. REMOVE COVER OF FIND 1 OR FIND 23, AS APPLICABLE
2. INSTALL FIND 2, FIND 3, FIND 8, & FIND 22 AS SHOWN
3. REPLACE COVER
4. INSTALL (4) FIND 9 AS SHOWN
5. INSTALL FIND 12, FIND 13, FIND 14, FIND 20 & FIND 21, AS REQUIRED FOR APPLICABLE DASH NO.

1020018	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.C. Taylor DATE 20 OCT
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSTALLATION OF
AGC TO HANDLING FIXTURE ASSY

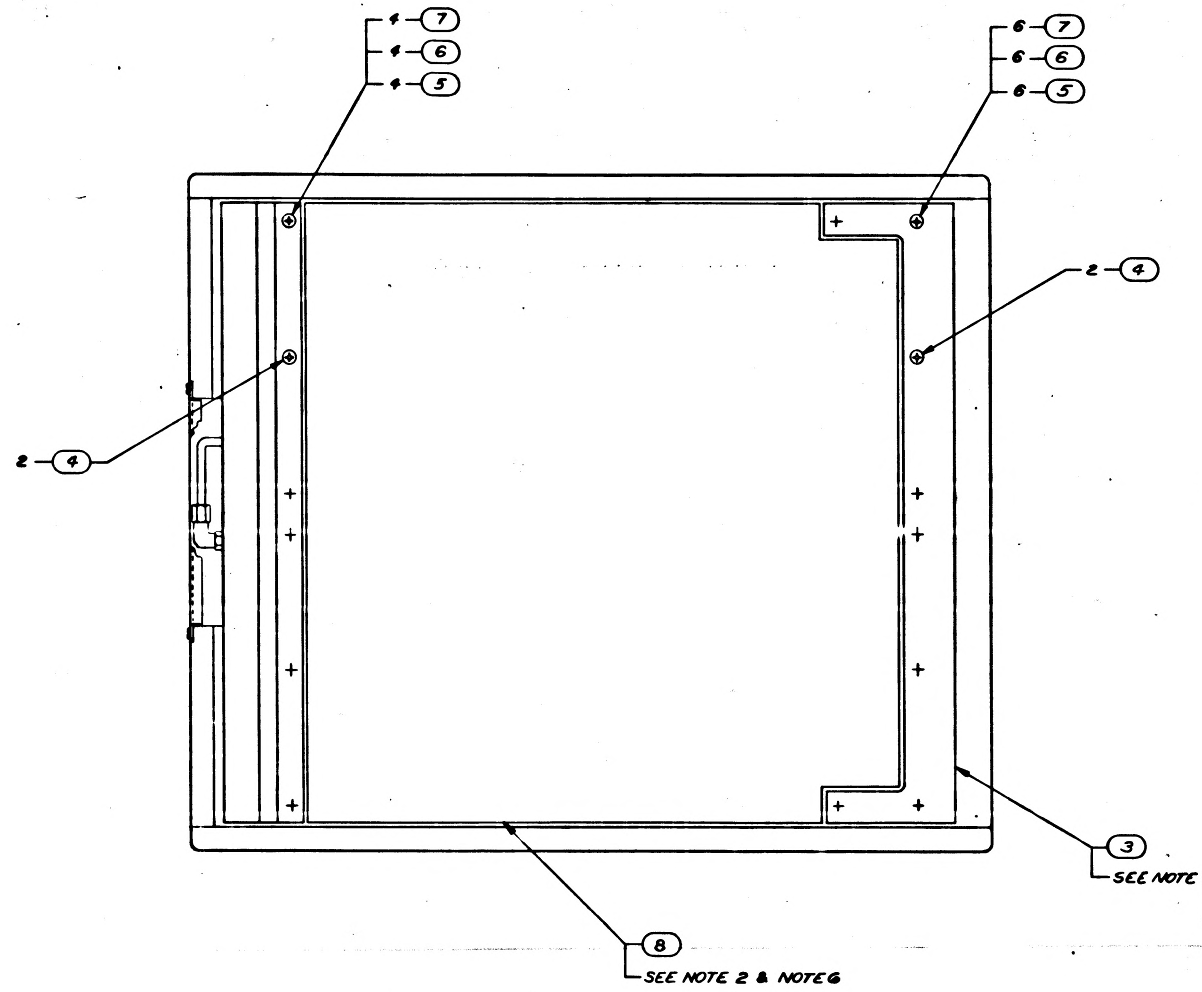
CODE IDENT NO — SIZE J NASA DRAWING NO 1020107
SCALE 1/2 WT SHEET 1 OF 1

MASTER

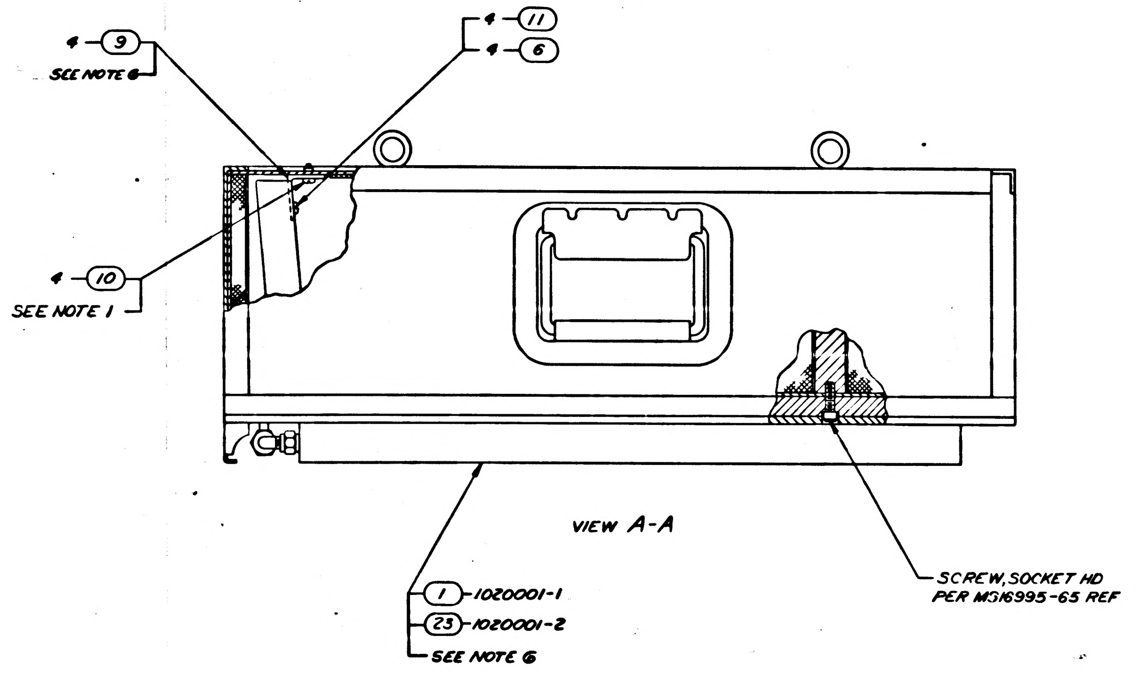
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020107

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 08125 DR. CHK Q.G.C. APPD	12 MAY 64	KEB
B	CHANGED PER TDRR 09779 DR CHK APP	16 Jun 64	KEB
C	CHANGED PER TDRR 12926 DR CHK APPD	14 OCT 64	KEB
D	REPLACED WITH CHANGES BY REV E PER TDRR 16295 DR J.P. CHK APPD	11 MAR 65	KEB

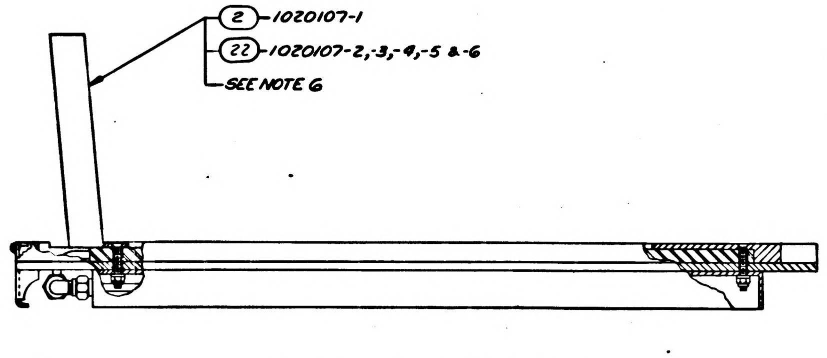


VIEW SHOWN WITH COVER REMOVED

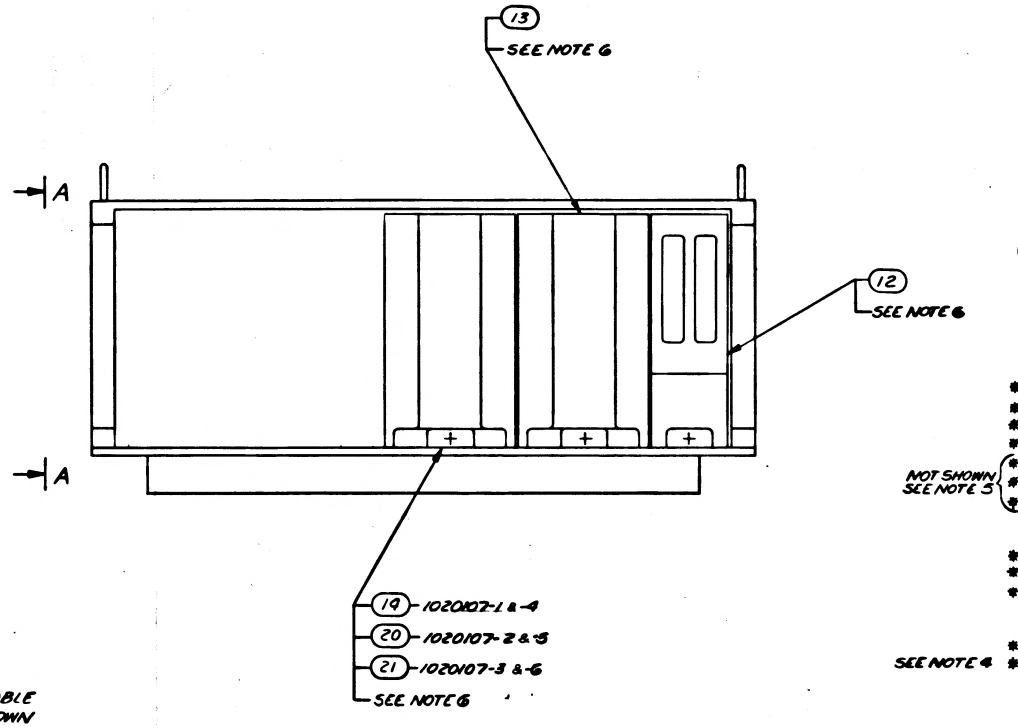


VIEW A-A

REV STATUS OF ASSYS	
PART NO.	REV SYM
1020107-1	C
1020107-2	C
1020107-3	C
1020107-4	C
1020107-5	C
1020107-6	C



VIEW SHOWN WITH COVER REMOVED



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE

Ⓓ REPLACED WITH CHANGE BY REV E

NOTES:
1. ASSEMBLE FIND NO. 10 USING FIND NO. 15
2. ASSEMBLE FIND NO. 8 USING FIND NO. 16 PER ND
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. FIND NO. 8 IS GOV'T FURNISHED MATL. (THERMAL INTERFACE, NORTH AMERICAN AVIATION PART NO.)
5. FIND NO. 17, 18 & 19 TO BE PKGD & MARKED PER ND1002019
6. DO NOT USE THIS DWG FOR PROCUREMENT OF FIND NO.'S 1, 2, 3, 8, 9, 12, 13, 14, 17, 18, 19, 20, 21, 22, & 23
7. SEE FAMILY TREE 1020016

ORDER OF ASSY
1. REMOVE COVER OF FIND 1 OR FIND 23, AS APPLICABLE
2. INSTALL FIND 2, FIND 3, FIND 8, & FIND 22 AS SHOWN
3. REPLACE COVER
4. INSTALL (4) FIND 9 AS SHOWN
5. INSTALL FIND 12, FIND 13, FIND 14, FIND 20 & FIND 21, AS REQUIRED FOR APPLICABLE DASH NO.

		QTY REQD -6	QTY REQD -5	QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
		⊠	⊠	⊠	⊠	⊠	⊠	1020215	BLOCK DIAG, AGC HANDLING EQUIP	REF
	*	1	1	1	—	—	—	1020001-2	HANDLING FIXTURE AGC	23
	*	1	1	—	1	1	—	1003466	END CONNECTOR ASSY	22
	*	1	—	—	1	—	—	1003476	MEMORY TRAY B	21
	*	—	1	—	—	1	—	1003465	MEMORY TRAY B	20
NOT SHOWN SEE NOTE 5	*	14	14	14	14	14	14	1010630-58	SCREW, FLAT HD HEX SOC	19
	*	4	4	4	4	4	4	AN104608	SCREW, HEX HD	18
	*	4	4	4	4	4	4	AN104606	SCREW, HEX HD	17
		AR	AR	AR	AR	AR	AR	1006879	THERMAL COND PASTE	16
		AR	AR	AR	AR	AR	AR	MIL-S-40083-CL31	SEALING COMPOUND	15
	*	—	—	1	—	—	1	1003184	MEMORY TRAY B	14
	*	1	1	1	1	1	1	1003187	LOGIC TRAY A	13
	*	1	1	1	1	1	1	1003197	G & N HARNESS TRAY	12
		4	4	4	4	4	4	MS35234-62	SCREW, MACH, PAN HD, SLOTTED	11
		4	4	4	4	4	4	MS35234-60	SCREW, MACH, PAN HD, SLOTTED	10
	*	4	4	4	4	4	4	1004272	BRACKET	9
SEE NOTE 4	*	1	1	1	1	1	1	G25-820518-31	CARRIER TUBE ASSY	8
		10	10	10	10	10	10	MS21044-C3	NUT, SELF-LOCKING	7
		14	14	14	14	14	14	MS15795-808	WASHER, PLAIN FLAT	6
		10	10	10	10	10	10	MS24693-C278	SCREW, MACH, FLAT CSK HD	5
		4	4	4	4	4	4	MS24693-C272	SCREW, MACH, FLAT CSK HD	4
	*	1	1	1	1	1	1	1003180	TOE PLATE	3
	*	—	—	1	—	—	1	1003189	END CONNECTOR ASSY	2
	*	—	—	—	1	1	1	1020001-1	HANDLING FIX. AGC	1

LIST OF MATERIALS

* SEE NOTE 6

NEXT ASSY	USED ON
1020016	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

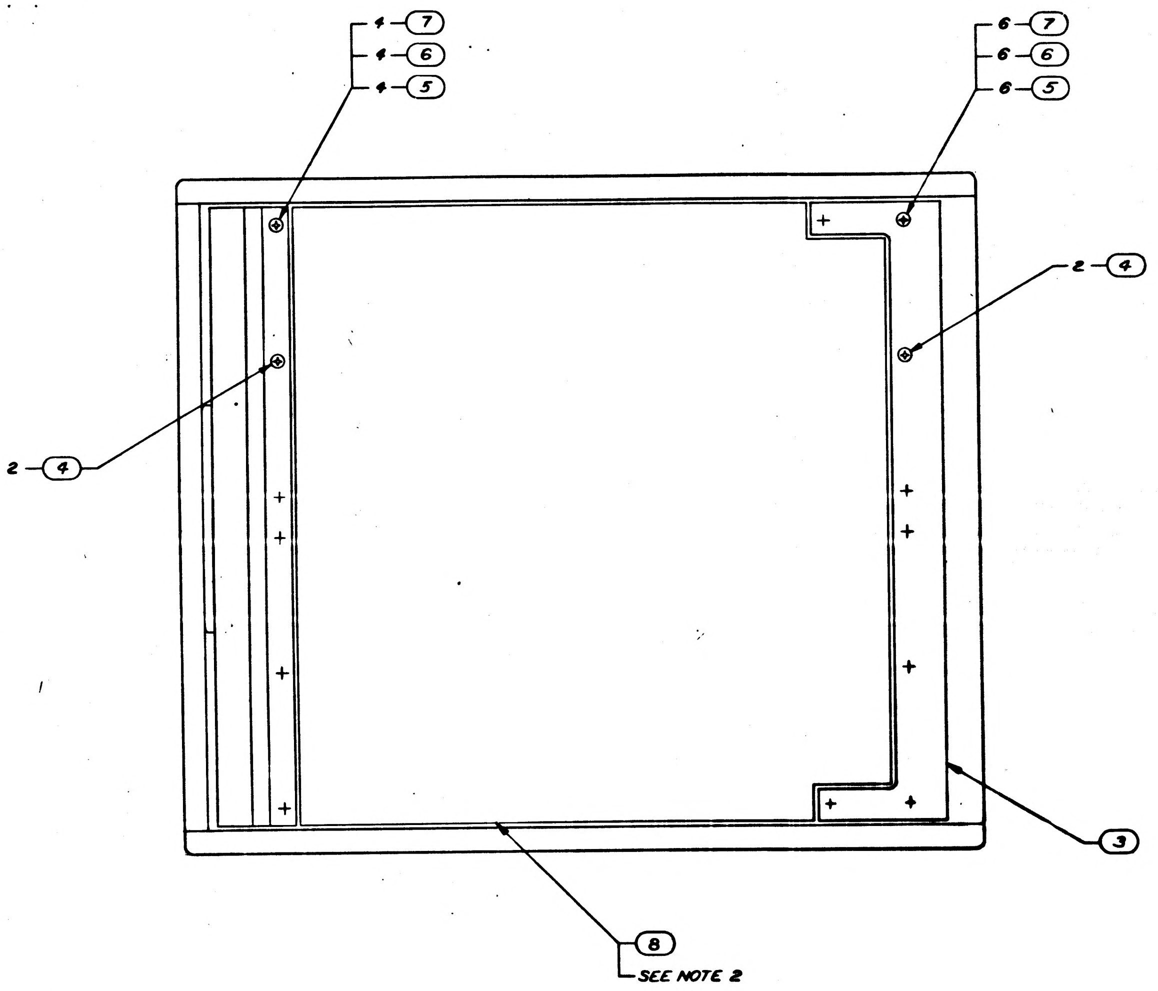
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN: R.C. Taylor DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

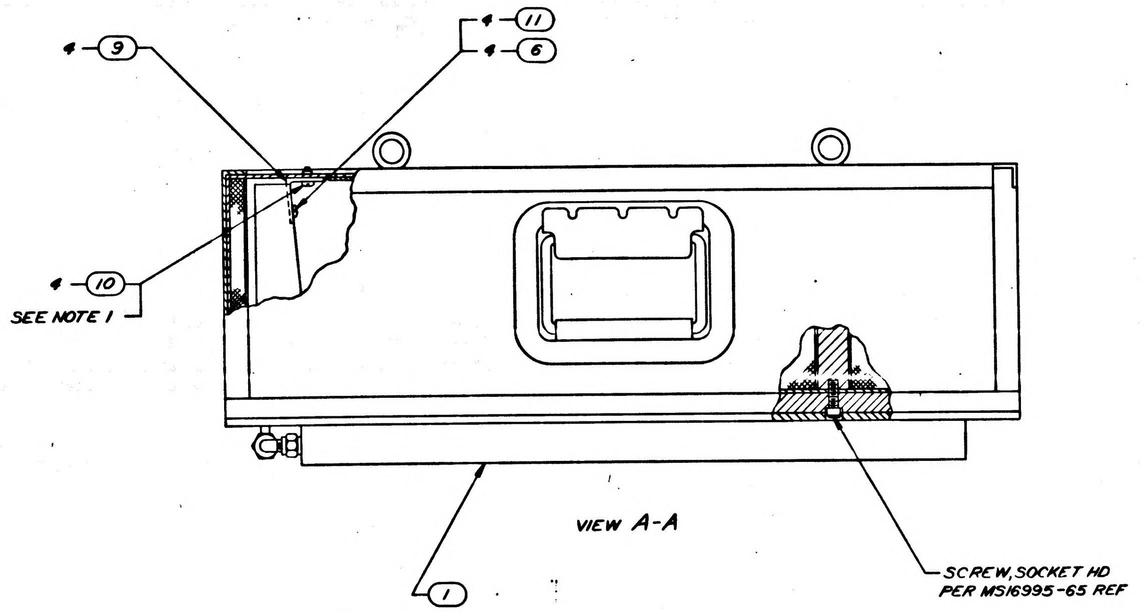
INSTALLATION OF
AGC TO HANDLING FIXTURE ASSY

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020107
SCALE 1/2
WT
SHEET 1 OF 1

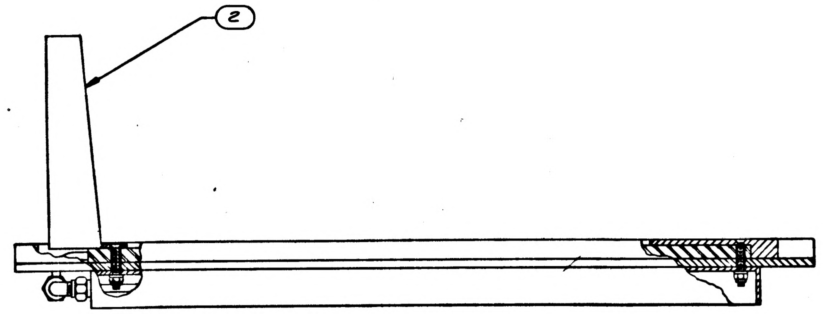
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 5761	[illegible]	



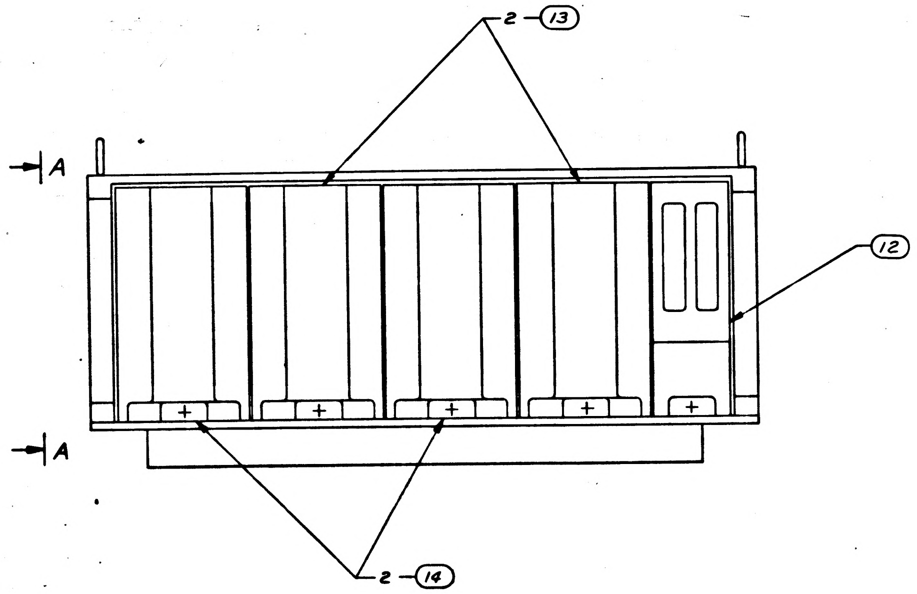
VIEW SHOWN WITH COVER REMOVED



VIEW A-A



VIEW SHOWN WITH COVER REMOVED



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 05761 DATE 1/14/64

NOTES:
1. ASSEMBLE FIND NO. 10 USING FIND NO. 15
2. ASSEMBLE FIND NO. 8 USING FIND NO. 16 PER ND
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. FIND NO 8 IS GOVT FURNISHED MATL. (THERMAL INTERFACE, NORTH AMERICAN AVIATION PART NO.)

ORDER OF ASSY
1. REMOVE COVER OF FIND 1
2. INSTALL FIND 2, FIND 3 & FIND 8 AS SHOWN
3. REPLACE COVER
4. INSTALL (4) FIND 9 AS SHOWN
5. INSTALL FIND 12, FIND 13 & FIND 14

SEE NOTE 4

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
A/R	1006879	THERMAL COND PASTE	16
A/R	MIL-S-40083-CL31	SEALING COMPOUND	15
2	1003184	MEMORY TRAY B	14
2	1003187	LOGIC TRAY A	13
1	1003197	G & N HARNESS TRAY	12
4	MS35234-62	SCREW, MACH, PAN HD, SLOTTED	11
4	MS35234-60	SCREW, MACH, PAN HD, SLOTTED	10
4	1004272	BRACKET	9
1	G25-820518-31	CARRIER TUBE ASSY	8
10	MS21044-C3	NUT, SELF-LOCKING	7
14	MS15795-308	WASHER, PLAIN FLAT	6
10	MS35201-60	SCREW, MACH, FLAT CSK HD	5
4	MS35201-55	SCREW, MACH, FLAT CSK HD	4
1	1003180	TOE PLATE	3
1	1003189	END CONNECTOR ASSY	2
1	1020001	HANDLING FIX. AGC	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020018	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN A. C. Taylor DATE 20DEC63
CHECKED T. [illegible]
APPROVAL C. Sawley [illegible]
APPROVAL [illegible]
APPROVAL [illegible] Jan 64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

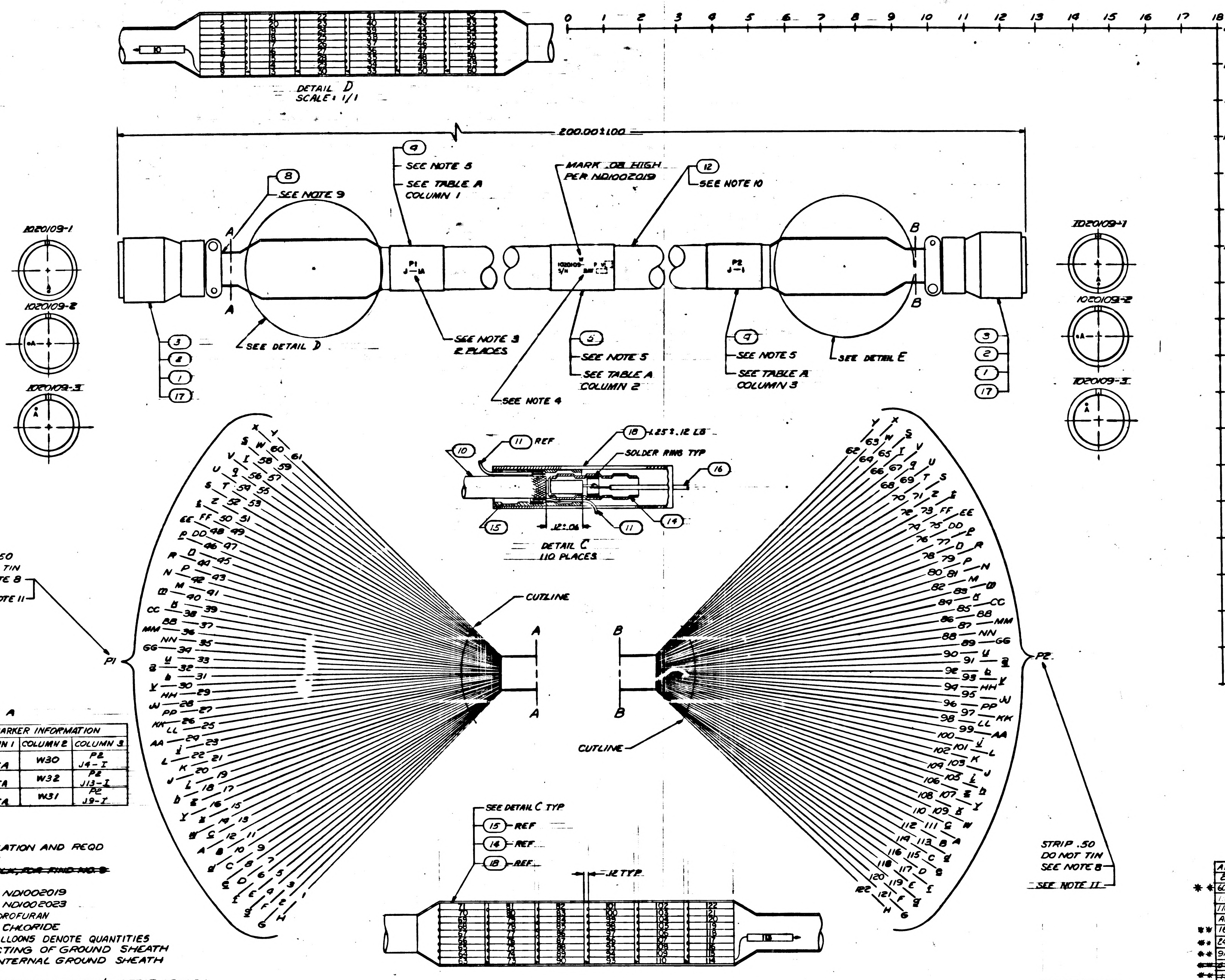
AGC TO HANDLING FIXTURE ASSY

CODE IDENT NO. —— SIZE J NASA DRAWING NO 1020107
SCALE 1/2 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020109

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 08865 DR ST. CHK APPD	7 AUG 64	


DETAIL D
SCALE: 1/1
200.00±.100
SEE NOTE 9
SEE NOTE 5
SEE TABLE A COLUMN 1
MARK .08 HIGH PER ND1002019
SEE NOTE 10
1020109-1
1020109-2
1020109-3
A
B
P1 J-1A
P2 J-1
SEE DETAIL D
SEE NOTE 3 2 PLACES
SEE NOTE 5
SEE TABLE A COLUMN 2
SEE NOTE 4
SEE TABLE A COLUMN 3
SEE DETAIL E
REF
1.25±.12 LG
SOLDER RING TYP
.12±.06
DETAIL C
110 PLACES
STRIP .50
DO NOT TIN
SEE NOTE 8
SEE NOTE 11
CUTLINE
P1
P2
SEE DETAIL C TYP
REF
.12 TYP
DETAIL E
SCALE 1/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0631 DATE 11 Feb 64

TABLE A

REV STATUS OF ASSY		MARKER INFORMATION		
PART NO.	REV SYMBOL	COLUMN 1	COLUMN 2	COLUMN 3
1020109-1	A	P1 J1-IA	W30	P2 J4-I
1020109-2	A	P1 J3-IA	W32	P2 J13-I
1020109-3	A	P1 J2-IA	W31	P2 J9-I

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. ~~MS25053, CLASS I, BLK, FOR FIND NO. 9 SIZE NO. 8~~
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
7. * FOR INTERCONNECTING OF GROUND SHEATH CONNECTIONS SEE INTERNAL GROUND SHEATH CONNECTION CHART
8. FOLD CONDUCTOR BACK ON ITSELF 1/2 STRIP LENGTH AND TWIST
9. WRAP FIND NO. 8 UNDER CABLE CLAMPS
10. SEAL FIND NO. 12 WITH FIND NO. 13
11. ATTACH FIND NO. 14 & 15 AS SHOWN IN DETAIL A
12. ✱✱ DENOTES: ATTACH FIND NO. 16 USING EXPRESS LENGTHS
13. MIL-I-23053, CLASS I, BLK, FOR FIND NO. 18, SIZE NO. 9
14. ATTACH FIND NO. 11 LG 3.75

A	A
SH 1	SH 2
REVISION STATUS OF SHEETS	

✱ DENOTES LENGTH IN FEET

	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	AR	AR	SEE NOTE 13	SLEEVING	18
	2	2	2	AN3420-12	BUSHING	17
✱✱	60.0	60.0	60.0	MIL-W-16878/4 E22 WHT	WIRE, ELEC	16
	110	110	110	1010402-2	SLEEVE, SOLDER	15
	110	110	110	1010902-1	SLEEVE, SOLDER	14
	AR	AR	AR		CEMENT	13
✱✱	16	16	16	1006696-8	TUBING, ZIPPER	12
✱✱	24.0	24.0	24.0	MIL-W-16878/4 E22, BLK	WIRE, ELEC	11
✱✱	910	910	910	RG180 B/U	WIRE, COAX	10
~~✱✱~~				~~SEE NOTE 2~~	~~SLEEVING~~	~~9~~
~~✱✱~~	~~1.3~~	~~1.3~~	~~1.3~~	~~1006692-3~~	~~TAPE, PRESSURE SENSITIVE ADHESIVE~~	~~8~~
	~~110~~	~~110~~	~~110~~	~~1000242-15~~	~~FERRULE, ELEC, COND~~	~~7~~
	~~110~~	~~110~~	~~110~~	~~1000243-10~~	~~FERRULE, ELEC, COND~~	~~6~~
	1	1	1	1019472-9	BANDMARKER, CABLE	5
	2	2	2	1019472-9A	BAND MARKER, CABLE	4
	2	—	—	MS3126F-24-61PZ	CONNECTOR	3
	—	2	—	MS3126F-24-61PY	CONNECTOR	2
	—	—	2	MS3126F-24-61PX	CONNECTOR	1

LIST OF MATERIALS

1014165	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

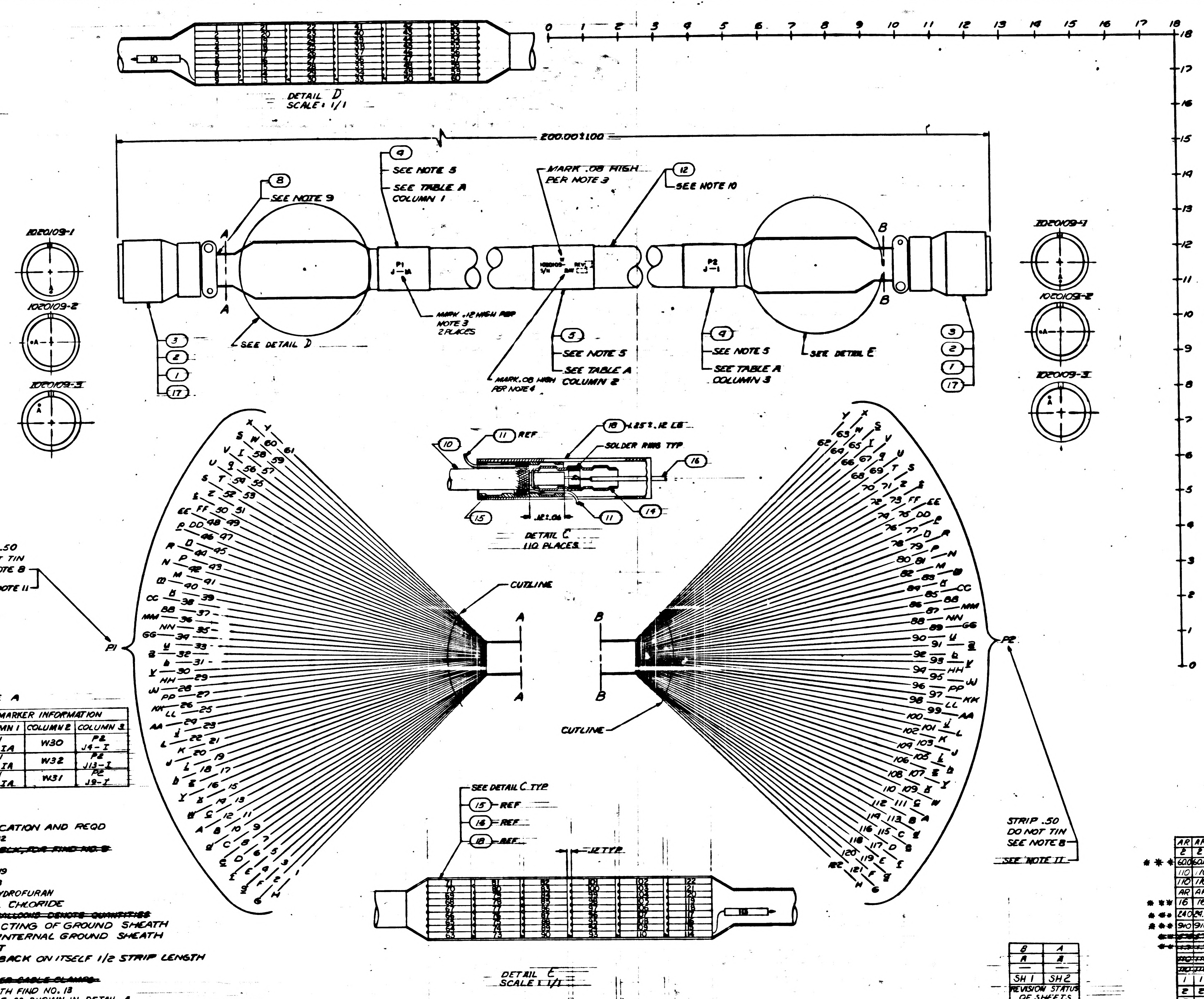
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W30, W31, W32
PROGRAMMER & MONITOR
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020109
SCALE 1/1 WT SHEET 1 OF 2

1020109

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 08865 DR ST. CHK APPD	AUG 64	
B	CHANGED PER TDRR 10895 DR CHK G.C. APPD V.W.		KGB


DETAIL D
SCALE: 1/1
200.00±1.00
SEE NOTE 5
SEE TABLE A COLUMN 1
MARK .08 HIGH PER NOTE 3
SEE NOTE 10
SEE NOTE 9
MARK .12 HIGH PER NOTE 3 2 PLACES
MARK .08 HIGH PER NOTE 4
SEE TABLE A COLUMN 2
SEE TABLE A COLUMN 3
SEE DETAIL D
SEE DETAIL E
1020109-1
1020109-2
1020109-3
REF
1.25±.12 LG
SOLDER RING TYP
.12±.06
DETAIL C
110 PLACES
CUTLINE
STRIP .50 DO NOT TIN SEE NOTE 8
SEE NOTE 11
P1
P2
SEE DETAIL C TYP
.12 TYP
DETAIL E
SCALE: 1/1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06316 DATE 11 Feb 64

TABLE A

REV STATUS OF ASSY		MARKER INFORMATION		
PART NO.	REV SYMBOL	COLUMN 1	COLUMN 2	COLUMN 3
1020109-1	A	P1 J1-1A	W30	P2 J4-I
1020109-2	A	P1 J3-1A	W32	P2 J13-I
1020109-3	A	P1 J2-1A	W31	P2 J9-I

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. ~~MS23053, CLASS I, BLK, FOR FIND NO. 9 SIZE NO. 9~~
3. MARK PER ND1002019
4. MARK PER ND1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. ~~NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES~~
7. * FOR INTERCONNECTING OF GROUND SHEATH CONNECTIONS SEE INTERNAL GROUND SHEATH CONNECTION CHART
8. FOLD CONDUCTOR BACK ON ITSELF 1/2 STRIP LENGTH AND TWIST
9. ~~WRAP FIND NO. 9 UNDER CABLE CLAMPS~~
10. SEAL FIND NO. 12 WITH FIND NO. 13
11. ATTACH FIND NO. 14 & 15 AS SHOWN IN DETAIL A
12. ✱✱ DENOTES: ATTACH FIND NO. 16 USING EXPRESS LENGTHS
13. MIL-I-23053, CLASS I, BLK, FOR FIND NO. 18, SIZE NO. 9
14. ATTACH FIND NO. 11 LG 3.75

B	A
A	A
SH 1	SH 2
REVISION STATUS OF SHEETS	

✱✱✱ DENOTES LENGTH IN FEET

	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	AR	AR	AR	SEE NOTE 13	SLEEVING	18
	2	2	2	AN3420-12	BUSHING	17
✱✱✱	60.0	60.0	60.0	MIL-W-16878/4 E22 WHT	WIRE, ELEC	16
	110	110	110	1010402-2	SLEEVE, SOLDER	15
	110	110	110	1010402-1	SLEEVE, SOLDER	14
	AR	AR	AR		CEMENT	13
✱✱✱	16	16	16	1006696-8	TUBING, ZIPPER	12
✱✱✱	24.0	24.0	24.0	MIL-W-16878/4 E22, BLK	WIRE, ELEC	11
✱✱✱	9.10	9.10	9.10	RG180 B/U	WIRE, COAX	10
~~✱✱~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~SEE NOTE 2~~	~~SLEEVING~~	9
~~✱✱~~	~~1.3~~	~~1.3~~	~~1.3~~	~~[illegible]-3~~	~~TAPE, PRESSURE SENSITIVE ADHESIVE~~	8
	~~110~~	~~110~~	~~110~~	~~[illegible]~~	~~FERRULE ELEC, COND~~	7
	~~110~~	~~110~~	~~110~~	~~1000293-10~~	~~FERRULE ELEC, COND~~	6
	1	1	1	1019972-9	BAND MARKER, CABLE	5
	2	2	2	1019972-9A	BAND MARKER, CABLE	4
	2	—	—	MS3126F-24-61PZ	CONNECTOR	3
	—	2	—	MS3126F-24-61PY	CONNECTOR	2
	—	—	2	MS3126F-24-61PX	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014465	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

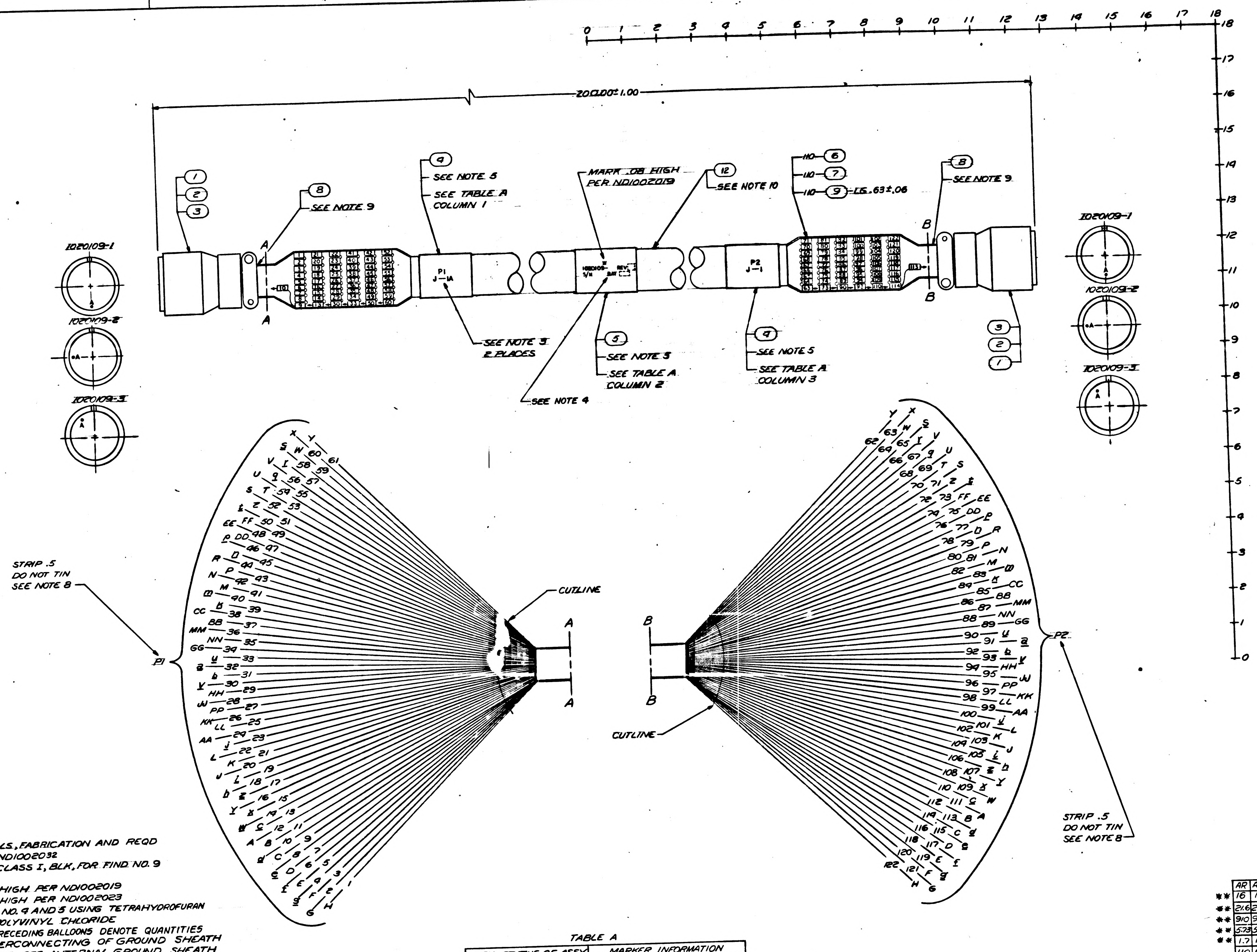
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-4[illegible]
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W30, W31, W32
PROGRAMMER & MONITOR
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020109
SCALE 1/1
WT
SHEET 1 OF 2

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



200.00 ± 1.00
1
2
3
8
SEE NOTE 9
A
9
SEE NOTE 5
SEE TABLE A COLUMN 1
P1 J-1A
SEE NOTE 3 2 PLACES
MARK .08 HIGH PER ND1002019
12
SEE NOTE 10
5
SEE NOTE 3
SEE TABLE A COLUMN 2
SEE NOTE 4
110-6
110-7
110-9 - LG. .63 ± .06
P2 J-1
9
SEE NOTE 5
SEE TABLE A COLUMN 3
B
SEE NOTE 9
1020109-1
1020109-2
1020109-3
STRIP .5 DO NOT TIN SEE NOTE 8
P1
CUTLINE
A
B
P2

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MS23053, CLASS I, BLK, FOR FIND NO. 9 SIZE NO. 5
3. MARK .12 HIGH PER ND1002019
4. MARK .08 HIGH PER ND1002023
5. BOND FIND NO. 4 AND 5 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
6. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES
7. * FOR INTERCONNECTING OF GROUND SHEATH CONNECTIONS SEE INTERNAL GROUND SHEATH CONNECTION CHART
8. FOLD CONDUCTOR BACK ON ITSELF 1/2 STRIP LENGTH AND TWIST
9. WRAP FIND NO. 8 UNDER CABLE CLAMPS
10. SEAL FIND NO. 12 WITH FIND NO. 18

TABLE A

REV STATUS OF ASSY		MARKER INFORMATION		
PART NO.	REV SYMBOL	COLUMN 1	COLUMN 2	COLUMN 3
1020109-1	—	P1 J1-IA	W30	P2 J9-I
1020109-2	—	P1 J3-IA	W32	P2 J13-I
1020109-3	—	P1 J2-IA	W31	P2 J9-I

SH 1	SH 2
—	—

REVISION STATUS OF SHEETS

** DENOTES LENGTH IN FEET

	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	AR	AR	AR		CEMENT	13
**	16	16	16	1006696-8	TUBING, ZIPPER	12
**	21.6	21.6	21.6	MIL-W-16878/4 E22, BLK	WIRE, ELEC	11
**	910	910	910	RG180 B/U	WIRE, COAX	10
**	5.73	5.73	5.73	SEE NOTE 2	SLEEVING	9
**	1.7	1.7	1.7	1006692-3	TAPE, PRESSURE SENSITIVE ADHESIVE	8
	110	110	110	1000292-15	FERRULE ELEC, COND	7
	110	110	110	1000293-10	FERRULE ELEC, COND	6
	1	1	1	1019472-7	BAND MARKER, CABLE	5
	2	2	2	1019472-7A	BAND MARKER, CABLE	4
	2	—	—	MS3126F-24-61PZ	CONNECTOR	3
	—	2	—	MS3126F-24-61PY	CONNECTOR	2
	—	—	2	MS3126F-24-61PX	CONNECTOR	1

LIST OF MATERIALS

1014165	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W30, W31, W32
PROGRAMMER & MONITOR
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020109
SCALE 1/1 WT SHEET 1 OF 2

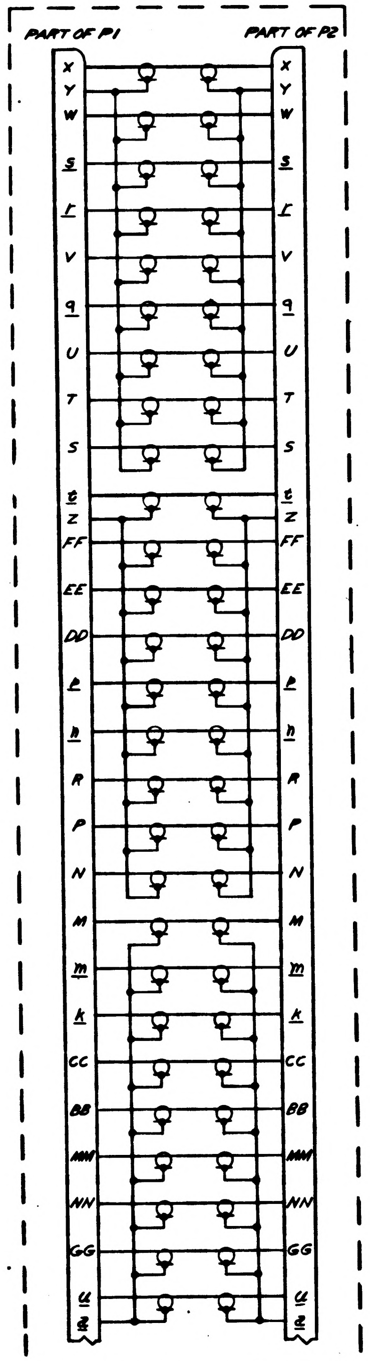
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

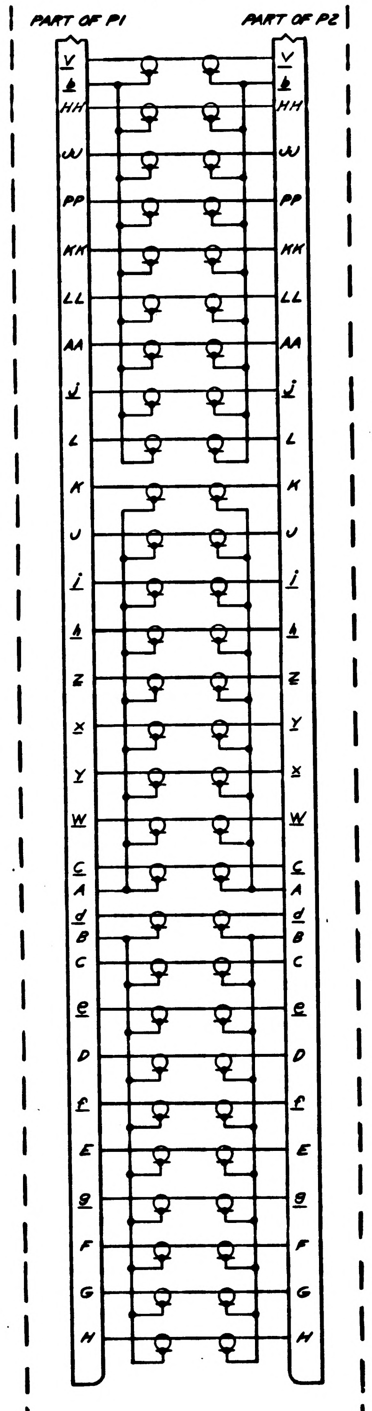
INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	60	COAX	30	10	63	
ATTACH FIND * NO.11 LG 6.5	61	SHLD			62	*ATTACH FIND NO.11 LG 6.5
	59	COAX	30	10	64	
*		SHLD				
	58	COAX	30	10	65	
*		SHLD				
	57	COAX	30	10	66	
*		SHLD				
	56	COAX	30	10	67	
*		SHLD				
	55	COAX	30	10	68	
*		SHLD				
	54	COAX	30	10	69	
*		SHLD				
	53	COAX	30	10	70	
*		SHLD				
	52	COAX	30	10	71	
*		SHLD				
	50	COAX	30	10	73	
ATTACH FIND * NO.11 LG 6.0	51	SHLD			72	*ATTACH FIND NO.11 LG 6.0
	49	COAX	30	10	74	
*		SHLD				
	48	COAX	30	10	75	
*		SHLD				
	47	COAX	30	10	76	
*		SHLD				
	46	COAX	30	10	77	
*		SHLD				
	45	COAX	30	10	78	
*		SHLD				
	44	COAX	30	10	79	
*		SHLD				
	43	COAX	30	10	80	
*		SHLD				
	42	COAX	30	10	81	
*		SHLD				
	41	COAX	30	10	82	
*		SHLD				
	40	COAX	30	10	83	
*		SHLD				
	39	COAX	30	10	84	
*		SHLD				
	38	COAX	30	10	85	
*		SHLD				
	37	COAX	30	10	86	
*		SHLD				
	36	COAX	30	10	87	
*		SHLD				
	35	COAX	30	10	88	
*		SHLD				
	34	COAX	30	10	89	
*		SHLD				
	33	COAX	30	10	90	
ATTACH FIND * NO.11 LG 5.5	32	SHLD			91	*ATTACH FIND NO.11 LG 5.5
	30	COAX	30	10	93	
ATTACH FIND * NO.11 LG 5.0	31	SHLD			92	*ATTACH FIND NO.11 LG 5.0
	29	COAX	30	10	94	
*		SHLD				
	28	COAX	30	10	95	
*		SHLD				
	27	COAX	30	10	96	
*		SHLD				
	26	COAX	30	10	97	
*		SHLD				
	25	COAX	30	10	98	
*		SHLD				
	24	COAX	30	10	99	
*		SHLD				
	23	COAX	30	10	100	
*		SHLD				
	22	COAX	30	10	101	
*		SHLD				
	21	COAX	30	10	102	
*		SHLD				
	20	COAX	30	10	103	
*		SHLD				
	19	COAX	30	10	104	
*		SHLD				
	18	COAX	30	10	105	
*		SHLD				
	17	COAX	30	10	106	
*		SHLD				
	16	COAX	30	10	107	
*		SHLD				
	15	COAX	30	10	108	
*		SHLD				
	14	COAX	30	10	109	
*		SHLD				

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	13	COAX	30	10	110	
ATTACH FIND * NO.11 LG 4.5	12	SHLD			111	*ATTACH FIND NO.11 LG 4.5
	10	COAX	30	10	113	
ATTACH FIND * NO.11 LG 3.5	11	SHLD			112	*ATTACH FIND NO.11 LG 3.5
	9	COAX	30	10	114	
*		SHLD				*
	8	COAX	30	10	115	
*		SHLD				*
	7	COAX	30	10	116	
*		SHLD				*
	6	COAX	30	10	117	
*		SHLD				*
	5	COAX	30	10	118	
*		SHLD				*
	4	COAX	30	10	119	
*		SHLD				*
	3	COAX	30	10	120	
*		SHLD				*
	2	COAX	30	10	121	
*		SHLD				*
	1	COAX	30	10	122	
*		SHLD				*





ELECTRICAL SCHEMATIC

INTERNAL GRD SHEATH CONNECTIONS			
FROM	TO	LENGTH	FIND NO.
60	59	2.0	11
59	58		
58	57		
57	56		
56	55		
55	54		
54	53		
53	52		
50	49		
49	48		
48	47		
47	46		
46	45		
45	44		
44	43		
43	42		
41	40		
40	39		
39	38		
38	37		
37	36		
36	35		
35	34		
34	33		
30	29		
29	28		
28	27		
27	26		
26	25		
25	24		
24	23		
23	22		
21	20		
20	19		
19	18		
18	17		
17	16		
16	15		
15	14		
14	13	2.0	
10	9	3.0	
9	8	2.0	
8	7		
7	6		
6	5		
5	4		
4	3		
3	2		
2	1		
63	64		
64	65		
65	66		
66	67		
67	68		
68	69		
69	70		
70	71		
73	74		
74	75		
75	76		
76	77		
77	78		
78	79		
79	80		
80	81		
82	83		
83	84		
84	85		
85	86		
86	87		
87	88		
88	89		
89	90		
93	94		
94	95		
95	96		
96	97		
97	98		
98	99		
99	100	2.0	11

INTERNAL GRD SHEATH CONNECTIONS			
FROM	TO	LENGTH	FIND NO.
100	101	2.0	11
102	103		
103	104		
104	105		
105	106		
106	107		
107	108		
108	109		
109	110	2.0	
113	114	3.0	
114	115	2.0	
115	116		
116	117		
117	118		
118	119		
119	120		
120	121		
121	122	2.0	11

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1014165	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.25 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN Ken Budd DATE 27 DEC 63
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
AIT APPROVAL 2-11-64

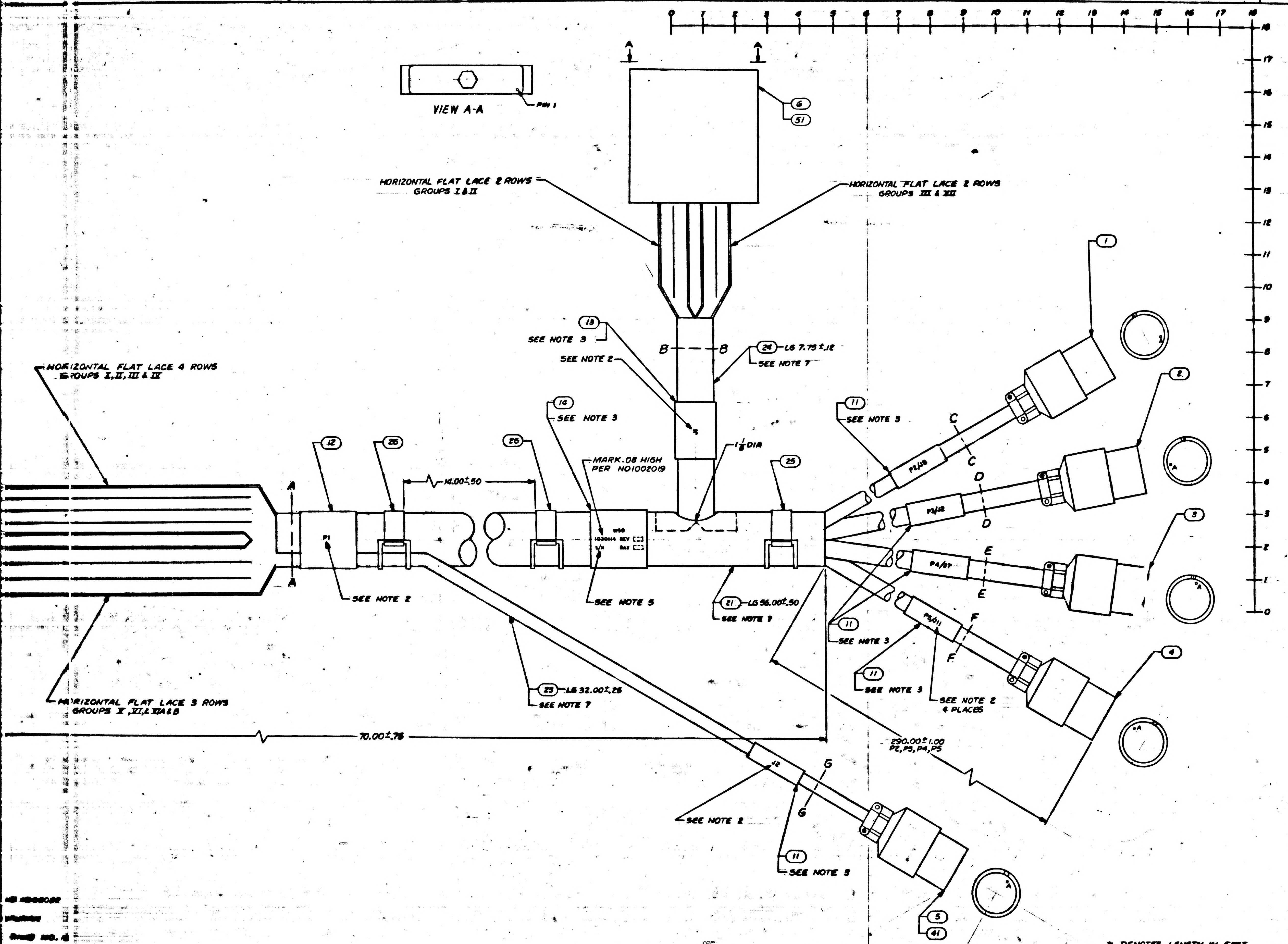
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W30 W31 W32
PROGRAMMER & MONITOR
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. ——— SIZE J NASA DRAWING NO 1020109
SCALE NONE WT SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1
PHOTOGRAPHIC SCALE ONLY


VIEW A-A
PIN 1
6
51
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & XII
13
SEE NOTE 3
SEE NOTE 2
B
B
24 LG 7.75±.12
SEE NOTE 7
1 1/8 DIA
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
12
26
14
SEE NOTE 3
26
14.00±.50
MARK .08 HIGH PER ND1002019
25
W50
1020114 REV
S/N
DAY
P1
SEE NOTE 2
SEE NOTE 5
21 LG 56.00±.50
SEE NOTE 7
A
A
11
SEE NOTE 3
P2/18
C
C
P3/12
D
D
P4/37
E
E
P5/11
F
F
11
SEE NOTE 3
11
SEE NOTE 3
SEE NOTE 2 4 PLACES
1
2
3
4
23 LG 32.00±.25
SEE NOTE 7
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI, & XII A & B
70.00±.75
290.00±1.00 P2, P3, P4, P5
J2
G
G
SEE NOTE 2
11
SEE NOTE 3
5
41
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
—	CL B RELEASED PER TDRR 0637	11 ... 64	
A	CHANGED PER TDRR 08131 DR Bakalinsky CHK APPD	15 ... 64	KES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. DATE

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	2	1010402-2	SLEEVING SHRINK SOLDER	52
	1	1006225-3	HOOD CONNECTOR	51
	3	1000242-29	FERRULE, ELEC CONDUCTOR	50
*	26.0	1006696-2	ZIPPER, TUBING	49
	244	1010738-1	CONTACT, ELEC, PIN	48
	244	1010738-2	CONTACT, ELEC, SOCKET	47
	AR		CEMENT	46
*	0.2	SEE NOTE 6	INSULATION, SLEEVING	45
	1	1000242-4	FERRULE, ELEC CONDUCTOR	44
	1	1000243-7	FERRULE, ELEC CONDUCTOR	43
*	10	1006696-1	ZIPPER, TUBING	42
	~~1~~		~~ADAPTER, SLEEVE~~	~~41~~
*	3.5	ND1002181 TYPE II CL4	WIRE, ELEC AWG 24 WHT & BLK	40
*	0.4	SEE NOTE 6	INSULATION SLEEVING	39
	1	1000242-16	FERRULE, ELEC CONDUCTOR	38
	1	1000243-14	FERRULE, ELEC CONDUCTOR	37
	3	100243-33	FERRULE, ELEC CONDUCTOR	36
*	1.0	SEE NOTE 6	INSULATION SLEEVING	35
	6	1000242-33	FERRULE, ELEC CONDUCTOR	34
	6	1000243-37	FERRULE, ELEC CONDUCTOR	33
*	1.0	SEE NOTE 6	INSULATION SLEEVING	32
	2	1000242-30	FERRULE, ELEC CONDUCTOR	31
	2	1000243-34	FERRULE, ELEC CONDUCTOR	30
*	0.3	SEE NOTE 6	INSULATION SLEEVING	29
	2	1000242-20	FERRULE, ELEC CONDUCTOR	28
	2	1000243-15	FERRULE, ELEC CONDUCTOR	27
	2	1006872-14	CLAMP, LOOP	26
	1	1006872-13	CLAMP, LOOP	25
*	8.0	1006696-7	ZIPPER, TUBING	24
*	36.0	1006696-3	ZIPPER, TUBING	23
*	66.0	1006696-4	ZIPPER, TUBING	22
*	4.7	1006696-9	ZIPPER, TUBING	21
*	60.0	SEE NOTE 4	WIRE, BRAID	20
*	65.0	SEE NOTE 4	WIRE, BRAID	19
*	10.5	SEE NOTE 4	WIRE, BRAID	18
*	8.0	MIL-W-16878/4 E24 BLK	WIRE, ELEC	17
*	867.0	MIL-W-16878/4 E24, WHT	WIRE, ELEC	16
*	1700	1014341-12	WIRE, ELEC	15
	1	1014472-9	BAND MARKER, CABLE	14
	1	1014472-5A	BAND MARKER, CABLE	13
	1	1014472-9A	BAND MARKER, CABLE	12
	5	1014472-1A	BAND MARKER, CABLE	11
	~~4~~	~~1006698~~	~~ADAPTER, SLEEVE~~	~~10~~
	~~1~~		~~HOOD, CONNECTOR~~	~~9~~
	1	1006225-1	HOOD, CONNECTOR	8
	1	1010641-1	CONNECTOR	7
	2	1006269-1	CONNECTOR	6
	1	MS3124F-12-10S	CONNECTOR	5
	1	MS3126F-24-61SZ	CONNECTOR	4
	1	MS3126F-24-61SX	CONNECTOR	3
	1	MS3126F-24-61SW	CONNECTOR	2
	1	MS3126F-24-61SY	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

A	A	A	A	A
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4065

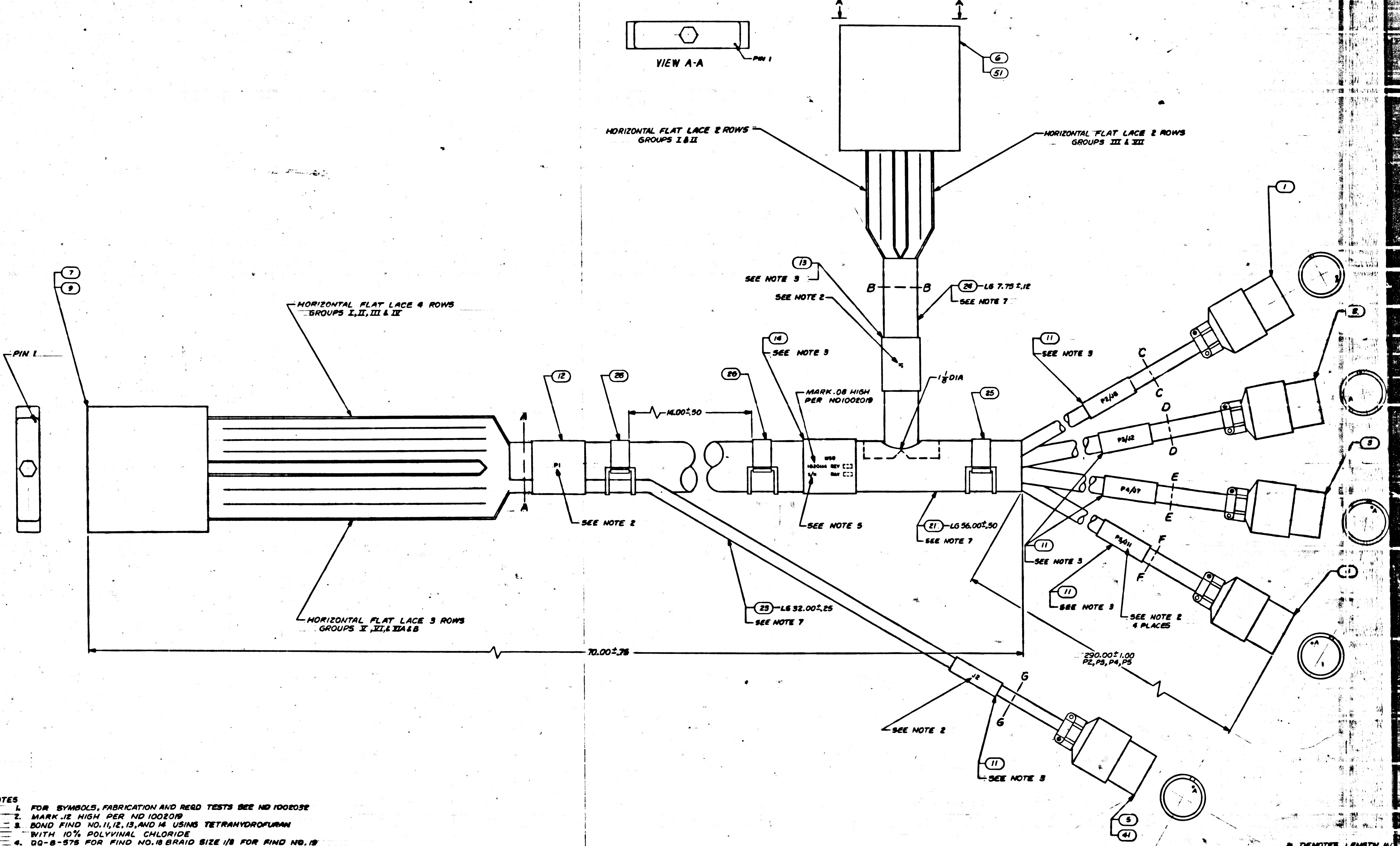
DRAWN W. Caplan DATE
CHECKED R. Gagnon 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
ENT APPROVAL
ENT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020114
SCALE 1/1
WT
SHEET 1 OF 5

1020114


VIEW A-A
PIN 1
6
51
A
A
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & VIII
1
13
SEE NOTE 3
SEE NOTE 2
B
B
24 LG 7.75 ±.12
SEE NOTE 7
2
7
9
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
PIN 1
14
SEE NOTE 3
11
SEE NOTE 3
C
C
12
26
26
14.00 ±.50
MARK .08 HIGH PER ND1002019
1 1/8 DIA
25
D
D
P2/J6
P3/J2
3
P1
SEE NOTE 2
SEE NOTE 5
21 LG 56.00 ±.50
SEE NOTE 7
P4/J7
E
E
P5/J11
F
F
11
SEE NOTE 3
11
SEE NOTE 3
SEE NOTE 2 4 PLACES
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI, & VIIA & B
23 LG 32.00 ±.25
SEE NOTE 7
70.00 ±.75
290.00 ±1.00 P2, P3, P4, P5
J2
G
G
SEE NOTE 2
11
SEE NOTE 3
5
41
A
A
A
A

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND 1002032
2. MARK .12 HIGH PER ND 1002019
3. BOND FIND NO. 11, 12, 13, AND 14 USING TETRAHYDROFURAN WITH 10% POLYVINAL CHLORIDE
4. QQ-B-575 FOR FIND NO. 18 BRAID SIZE 1/8 FOR FIND NO. 19 BRAID SIZE 3/8 FOR FIND NO. 20 BRAID SIZE 1/2
5. MARK .08 HIGH PER ND 1002023
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 29 SIZE NO. 4, FOR FIND NO. 32 SIZE NO. 7/16, FOR FIND NO. 35 SIZE NO. 1/2 FOR FIND NO. 39 SIZE NO. 6 FOR FIND NO. 45 SIZE NO. 5/8
7. SEAL FIND NO. 21, 22, 23, 24, & 42 WITH FIND NO. 46
~~8. DISCARD CONTACTS SUPPLIED WITH FIND NO. [illegible]~~
9. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

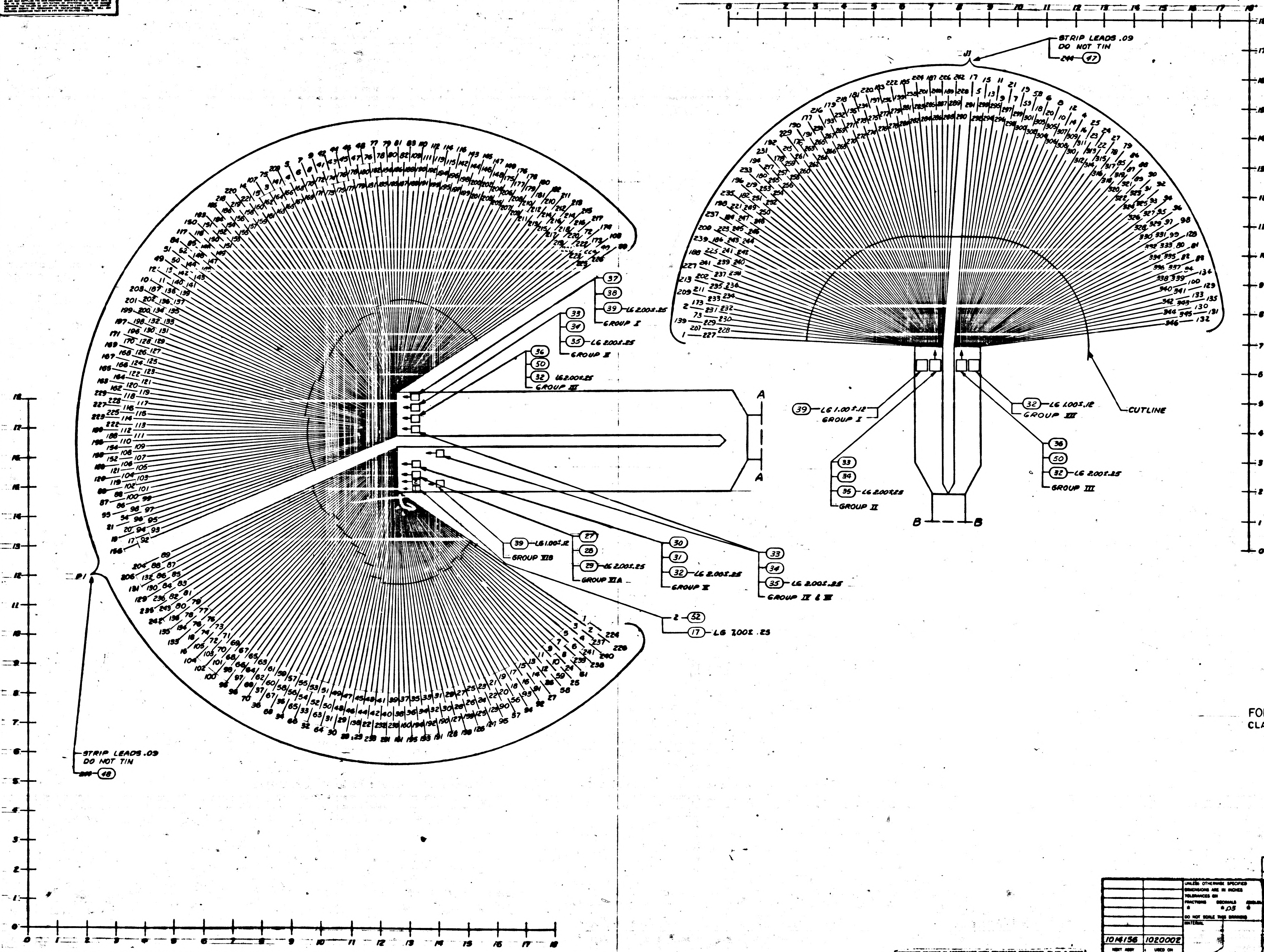
* DENOTES LENGTH IN

A	A	A	A	A
—	—	—	—	—
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

1011156
1020002

SYM	DESCRIPTIO
—	CC B RELEASED P
A	CHANGED PER TDR DR BKatula CHK



STRIP LEADS .09
DO NOT TIN
244 — 47
J1
CUTLINE
39 — LG 1.00±.12
GROUP I
32 — LG 1.00±.12
GROUP III
33
34
35 — LG 2.00±.25
GROUP II
36
50
32 — LG 2.00±.25
GROUP III
B — B
37
38
39 — LG 2.00±.25
GROUP I
33
34
35 — LG 2.00±.25
GROUP II
36
50
32 — LG 2.00±.25
GROUP III
A
A
39 — LG 1.00±.12
GROUP VIB
27
28
29 — LG 2.00±.25
GROUP VIA
30
31
32 — LG 2.00±.25
GROUP V
33
34
35 — LG 2.00±.25
GROUP IV & III
2 — 52
17 — LG 2.00±.25
P1
STRIP LEADS .09
DO NOT TIN
249 — 48

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO.

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

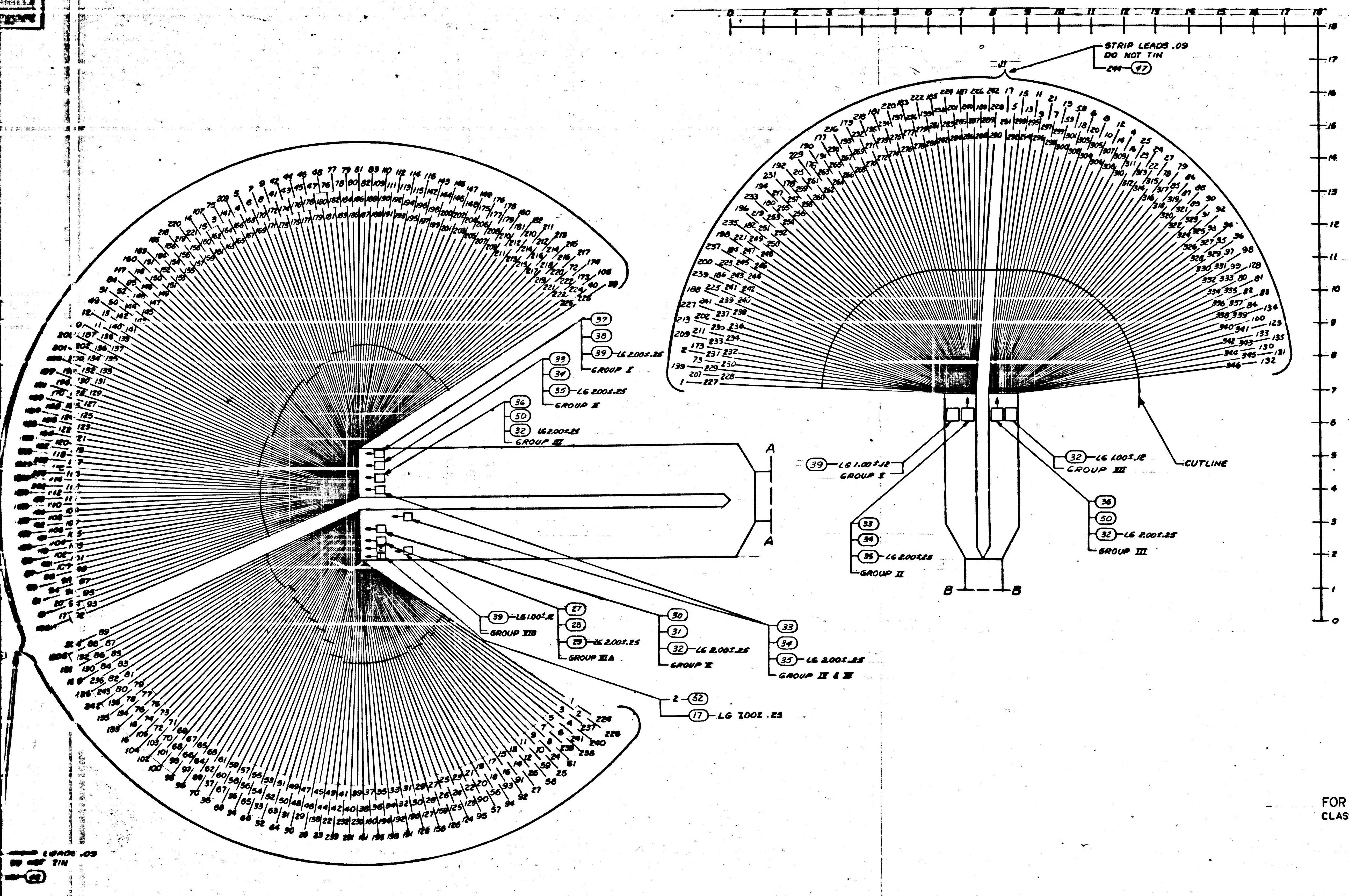
QTY REQD | PART OR IDENTIFYING NO.
LIST OF MATE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 5-493
DRAWN H. Coghlan DATE
CHECKED
APPROVAL
NASA APPROVAL

CABLE AS
SPACECR

F01/2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 01631	11/28/67	
A	CHANGED PER TDRR 08131 DR [illegible] CHK [illegible] APPD		NEB



STRIP LEADS .09
DO NOT TIN
244 47
J1
CUTLINE
39 LG 1.00±.12 GROUP I
32 LG 1.00±.12 GROUP III
33 34 35 LG 2.00±.25 GROUP II
36 50 32 LG 2.00±.25 GROUP III
B B
37 38 39 LG 2.00±.25 GROUP I
33 34 35 LG 2.00±.25 GROUP II
36 50 32 LG 2.00±.25 GROUP III
A A
39 LG 1.00±.12 GROUP VIIB
27 28 29 LG 2.00±.25 GROUP VIIA
30 31 32 LG 2.00±.25 GROUP V
33 34 35 LG 2.00±.25 GROUP IV & III
2 52
17 LG 2.00±.25
STRIP LEADS .09
DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 01631 DATE 2/1/67

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON MASS.
CONTRACT NO NAS 9-4065
DRAWN W. Carlson DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SUBMIT APPROVAL
SUBMIT APPROVAL

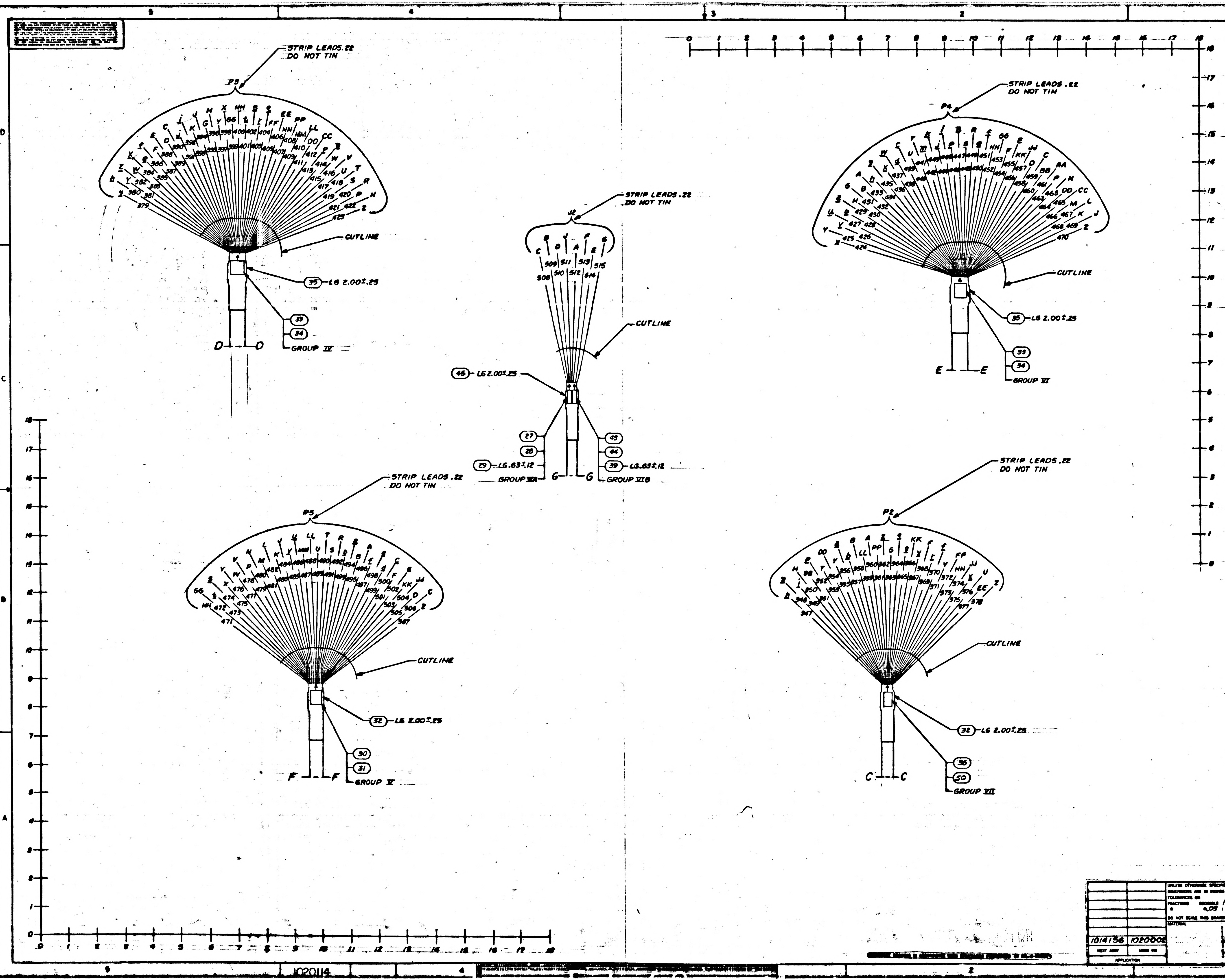
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020114
SCALE 1/1 WT SHEET

1020114

SYM	DESCRIPTION
—	CL. B RELEASED PER
A	CHANGED PER TDRR DR BK. CHK.


STRIP LEADS .22
DO NOT TIN
P3
CUTLINE
35 LG 2.00±.25
33
34
GROUP IV
D — D
J2
STRIP LEADS .22
DO NOT TIN
CUTLINE
45 LG 2.00±.25
27
28
29 LG.63±.12
GROUP VIIA
G — G
43
44
39 LG.63±.12
GROUP VIIB
STRIP LEADS .22
DO NOT TIN
P4
CUTLINE
35 LG 2.00±.25
33
34
GROUP VI
E — E
STRIP LEADS .22
DO NOT TIN
P5
CUTLINE
32 LG 2.00±.25
30
31
GROUP V
F — F
STRIP LEADS .22
DO NOT TIN
P2
CUTLINE
32 LG 2.00±.25
36
50
GROUP VII
C — C

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO.

1014156	1020006
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.05 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD | PART OR IDENTIFYING NO. | LIST OF MATERIALS

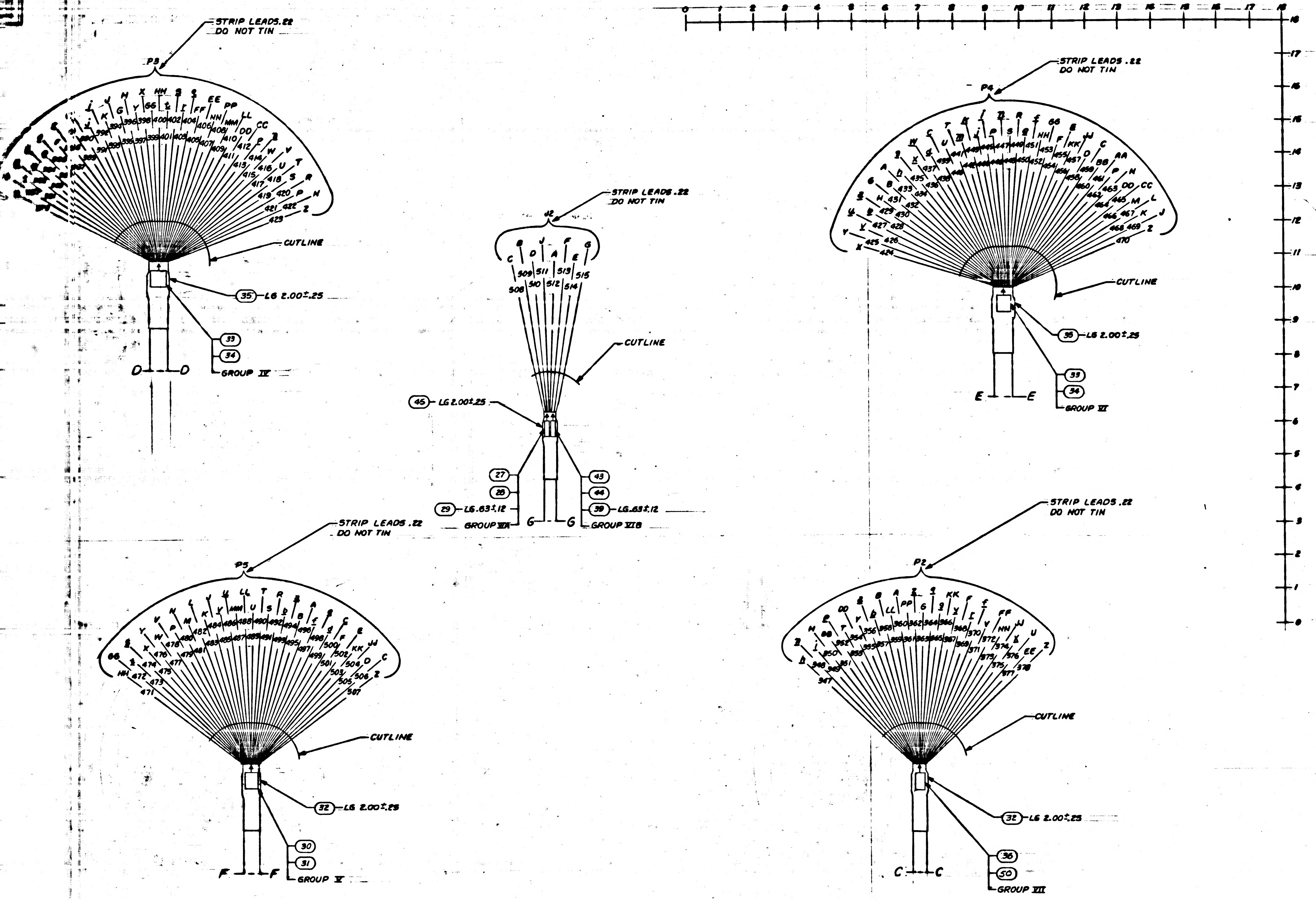
RAYTHEON CO
LEXINGTON, MASS
CONTRACT NO. NAS 9-
DRAWN H. Cashman
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL

CABLE ASS

SCALE 1/1

1020114

SYM	DESCRIPTION	DATE	APPROVED
~~—~~	~~CL B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 08131 DR CHK APPD	64	NLS


STRIP LEADS .22 DO NOT TIN
P3
CUTLINE
35 — LG 2.00±.25
33
34
GROUP IV
D—D
J2
STRIP LEADS .22 DO NOT TIN
CUTLINE
46 — LG 2.00±.25
27
28
29 — LG .63±.12
GROUP VIIA
G—G
43
44
39 — LG .63±.12
GROUP VIIB
P4
STRIP LEADS .22 DO NOT TIN
CUTLINE
35 — LG 2.00±.25
33
34
GROUP VI
E—E
P5
STRIP LEADS .22 DO NOT TIN
CUTLINE
32 — LG 2.00±.25
30
31
GROUP V
F—F
P2
STRIP LEADS .22 DO NOT TIN
CUTLINE
32 — LG 2.00±.25
36
50
GROUP VII
C—C

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 6317 DATE 2/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

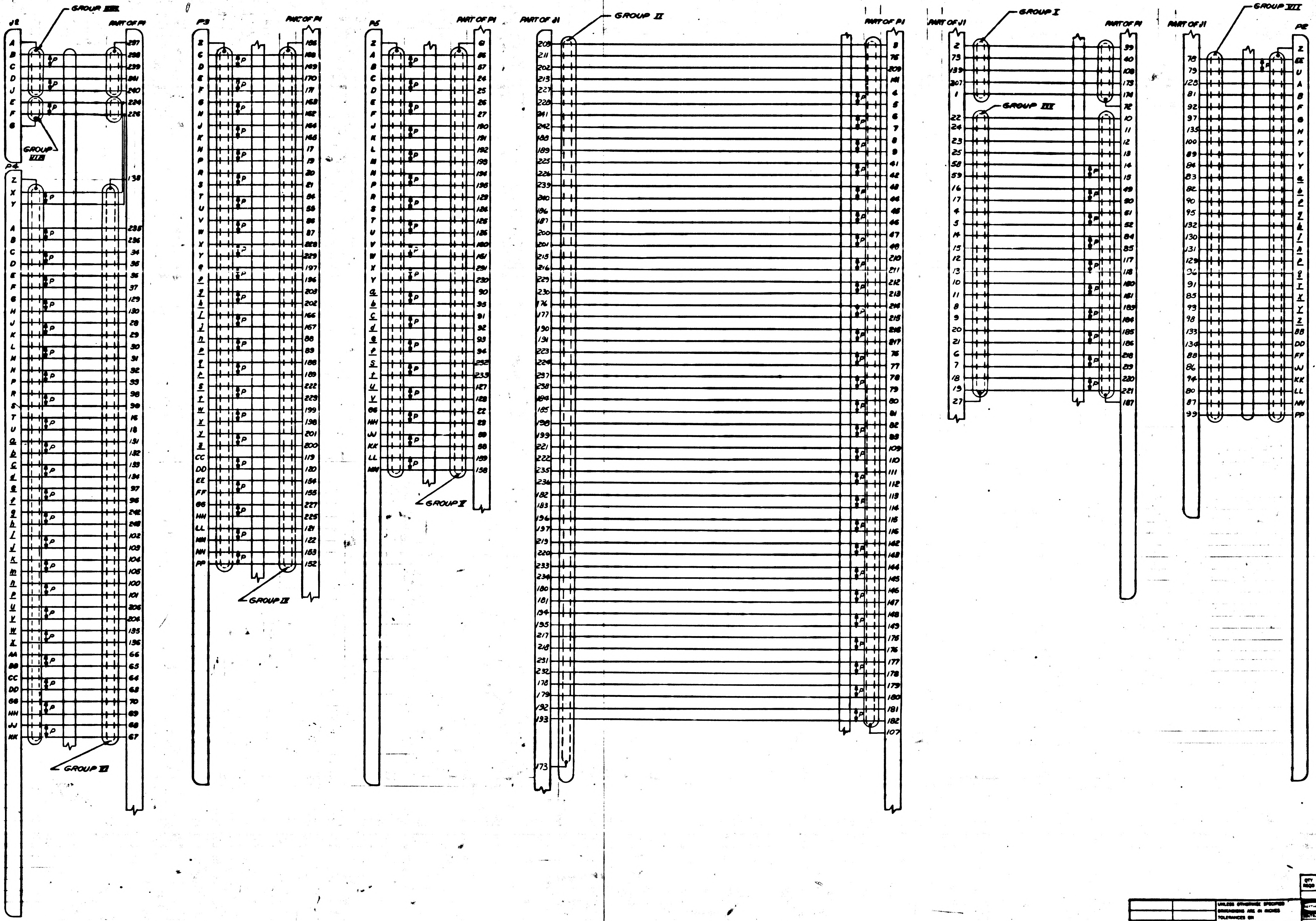
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-497
DRAWN H Carlson
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11
DGT APPROVAL
DGT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020114
SCALE 1/1
SHEET


J2
PART OF P1
GROUP VIII
GROUP VII
P4
GROUP VI
P3
PART OF P1
GROUP IV
P5
PART OF P1
GROUP V
PART OF J1
GROUP II
PART OF P1
PART OF J1
GROUP I
GROUP III
PART OF P1
PART OF J1
GROUP VII
P2
P

FOR INFORMAT

CLASS B RELEASE T

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

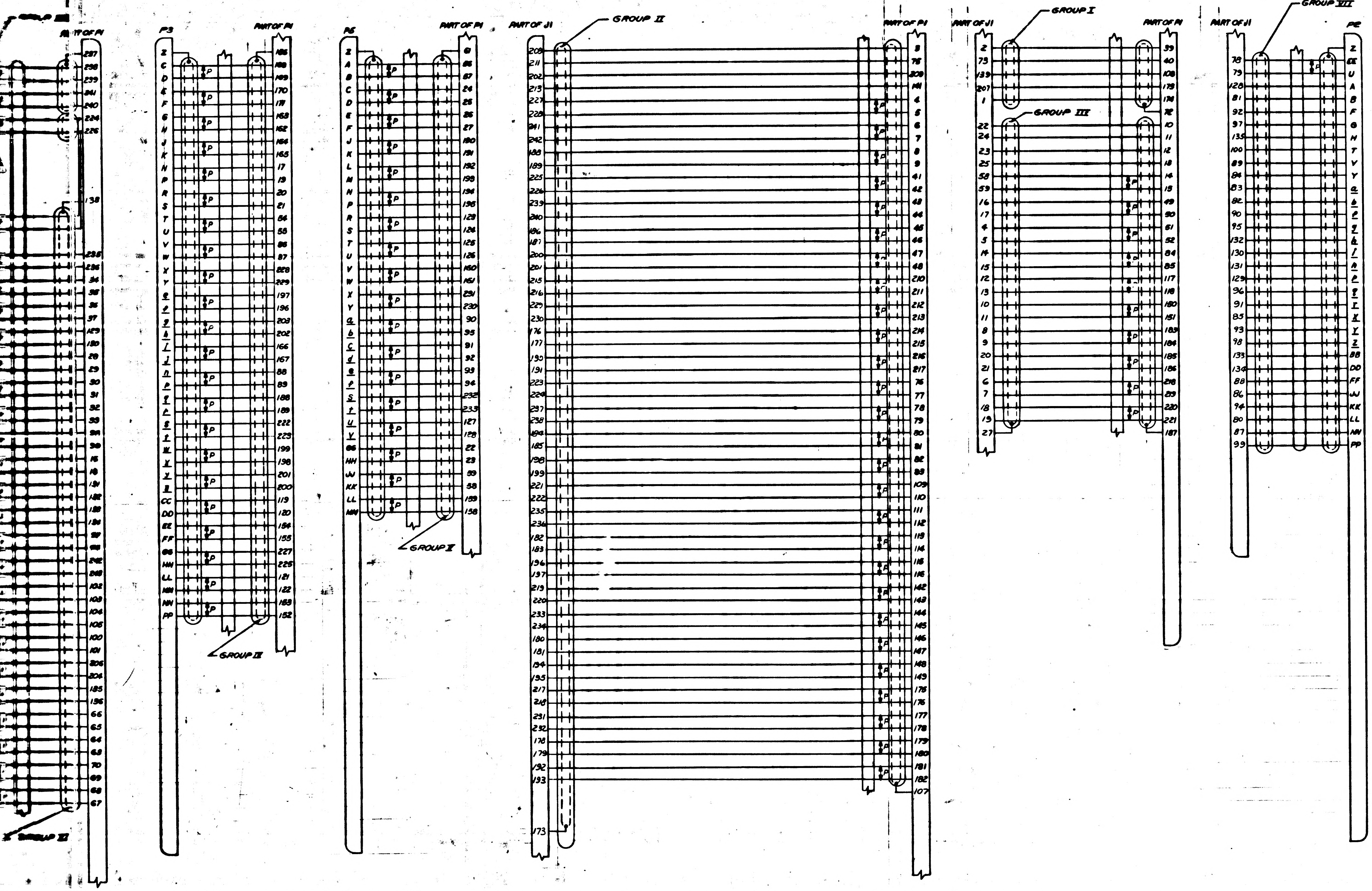
RAYTHEON CO.
LEXINGTON
CONTRACT NO NAS 9-

CABLE

SPACE

1020114

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 0617		
A	CHANGED PER TDRR 08131 DR. CHK. APPD	6-6	



GROUP III
PART OF P1
P3
P5
PART OF J1
GROUP II
GROUP I
GROUP VII
P2
GROUP IV
GROUP V
GROUP VI
P

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0617 DATE 2/4/64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-4918
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020114
SCALE NONE
WT
SHEET 4 OF 5

1020114

4110501

ASSEMBLY INFORMATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	1	WHT	24	40	514	GROUP VI B
	2	BLK			513	
		SHIELD			515	*
	4	WHT	24	15	511	GROUP VI A ATTACH FIND NO. 18 & 42 LG 35.00 ± .50 * SEE NOTE 7
	5	BLK			510	
	6	WHT	24	15	509	
	7	BLK			508	
*	3	SHIELD			512	
	9	WHT	24	15	506	GROUP V ATTACH FIND NO. 19 AND 23 LG 354.00 ± 2.00 SEE NOTE 7
	10	BLK			505	
	11	WHT	24	15	504	
	12	BLK			503	
	13	WHT	24	15	502	
	14	BLK			501	
	15	WHT	24	15	500	
	16	BLK			499	
	17	WHT	24	15	498	
	18	BLK			497	
	19	WHT	24	15	496	
	20	BLK			495	
	21	WHT	24	15	494	
	22	BLK			493	
	23	WHT	24	15	492	
	24	BLK			491	
	25	WHT	24	15	490	
	26	BLK			489	
	27	WHT	24	15	488	
	28	BLK			487	
	29	WHT	24	15	486	
	30	BLK			485	
	31	WHT	24	15	484	
	32	BLK			483	
	33	WHT	24	15	482	
	34	BLK			481	
	35	WHT	24	15	480	
	36	BLK			479	
	37	WHT	24	15	478	
	38	BLK			477	
	39	WHT	24	15	476	
	40	BLK			475	
	41	WHT	24	15	474	
	42	BLK			473	
	43	WHT	24	15	472	
	44	BLK			471	
*	8	SHIELD			507	*
	46	WHT	24	15	469	GROUP VI ATTACH FIND NO. 20 AND 22 LG 354.00 ± 2.00 SEE NOTE 7
	47	BLK			468	
	48	WHT	24	15	467	
	49	BLK			466	
	50	WHT	24	15	465	
	51	BLK			464	
	52	WHT	24	15	463	
	53	BLK			462	
	54	WHT	24	15	461	
	55	BLK			460	
	56	WHT	24	15	459	
	57	BLK			458	
	58	WHT	24	15	457	
	59	BLK			456	
	60	WHT	24	15	455	
	61	BLK			454	
	62	WHT	24	15	453	
	63	BLK			452	
	64	WHT	24	15	451	
	65	BLK			450	
	66	WHT	24	15	449	
	67	BLK			448	
	68	WHT	24	15	447	
	69	BLK			446	
	70	WHT	24	15	445	
	71	BLK			444	
	72	WHT	24	15	443	
	73	BLK			442	
	74	WHT	24	15	441	
	75	BLK			440	
	76	WHT	24	15	439	
	77	BLK			438	
	78	WHT	24	15	437	
	79	BLK			436	
	80	WHT	24	15	435	
	81	BLK			434	
	82	WHT	24	15	433	
	83	BLK			432	
	84	WHT	24	15	431	
	85	BLK			430	
	86	WHT	24	15	429	
	87	BLK			428	
	88	WHT	24	15	427	
	89	BLK			426	

ASSEMBLY INFORMATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	1	WHT	24	15	425	
	2	BLK			424	
*	45	SHIELD			470	*
	93	WHT	24	15	422	GROUP IV ATTACH FIND NO. 20 AND 22 LG 354.00 ± 2.00 SEE NOTE 7
	94	BLK			421	
	95	WHT	24	15	420	
	96	BLK			419	
	97	WHT	24	15	418	
	98	BLK			417	
	99	WHT	24	15	416	
	100	BLK			415	
	101	WHT	24	15	414	
	102	BLK			413	
	103	WHT	24	15	412	
	104	BLK			411	
	105	WHT	24	15	410	
	106	BLK			409	
	107	WHT	24	15	408	
	108	BLK			407	
	109	WHT	24	15	406	
	110	BLK			405	
	111	WHT	24	15	404	
	112	BLK			403	
	113	WHT	24	15	402	
	114	BLK			401	
	115	WHT	24	15	400	
	116	BLK			399	
	117	WHT	24	15	398	
	118	BLK			397	
	119	WHT	24	15	396	
	120	BLK			395	
	121	WHT	24	15	394	
	122	BLK			393	
	123	WHT	24	15	392	
	124	BLK			391	
	125	WHT	24	15	390	
	126	BLK			389	
	127	WHT	24	15	388	
	128	BLK			387	
	129	WHT	24	15	386	
	130	BLK			385	
	131	WHT	24	15	384	
	132	BLK			383	
	133	WHT	24	15	382	
	134	BLK			381	
	135	WHT	24	15	380	
	136	BLK			379	
*	92	SHIELD			423	*
	138	WHT	24	16	314	GROUP III ATTACH FIND NO. 19 AND 22 LG 75.00 ± 1.00 SEE NOTE 7
	139	WHT	24	16	313	
	140	WHT	24	16	312	
	141	WHT	24	16	311	
	142	WHT	24	15	310	
	143	BLK			291	
	144	WHT	24	15	309	
	145	BLK			292	
	146	WHT	24	15	308	
	147	BLK			293	
	148	WHT	24	15	307	
	149	BLK			294	
	150	WHT	24	15	306	
	151	BLK			295	
	152	WHT	24	15	305	
	153	BLK			296	
	154	WHT	24	15	304	
	155	BLK			297	
	156	WHT	24	15	303	
	157	BLK			298	
	158	WHT	24	15	302	
	159	BLK			299	
	160	WHT	24	15	301	
	161	BLK			300	
*	137	SHIELD			315	*
	163	WHT	24	16	233	GROUP II ATTACH FIND NO. 20 AND 22 LG 75.00 ± 1.00 SEE NOTE 7
	164	WHT	24	16	234	
	165	WHT	24	16	235	
	166	WHT	24	16	236	
	167	WHT	24	15	237	
	168	BLK			290	
	169	WHT	24	15	238	
	170	BLK			289	
	171	WHT	24	15	239	
	172	BLK			288	
	173	WHT	24	15	240	
	174	BLK			287	
	175	WHT	24	15	241	
	176	BLK			286	
	177	WHT	24	15	242	
	178	BLK			285	

ASSEMBLY INFORMATION CHART

FROM REMARKS	FROM RUN NO.	COLOR	AWG	FIND NO.	TO RUN NO.	TO REMARKS
	179	WHT	24	15	243	
	180	BLK			284	
	181	WHT	24	15	244	
	182	BLK			283	
	183	WHT	24	15	245	
	184	BLK			282	
	185	WHT	24	15	246	
	186	BLK			281	
	187	WHT	24	15	247	
	188	BLK			280	
	189	WHT	24	15	248	
	190	BLK			279	
	191	WHT	24	15	249	
	192	BLK			278	
	193	WHT	24	15	250	
	194	BLK			277	
	195	WHT	24	15	251	
	196	BLK			276	
	197	WHT	24	15	252	
	198	BLK			275	
	199	WHT	24	15	253	
	200	BLK			274	
	201	WHT	24	15	254	
	202	BLK			273	
	203	WHT	24	15	255	
	204	BLK			272	
	205	WHT	24	15	256	
	206	BLK			271	
	207	WHT	24	15	257	
	208	BLK			270	
	209	WHT	24	15	258	
	210	BLK			269	
	211	WHT	24	15	259	
	212	BLK			268	
	213	WHT	24	15	260	
	214	BLK			267	
	215	WHT	24	15	261	
	216	BLK			266	
	217	WHT	24	15	262	
	218	BLK			265	
	219	WHT	24	15	263	
	220	BLK			264	
*	162	SHIELD			232	*
	222	WHT	24	16	227	GROUP I ATTACH FIND NO. 18 AND 42 LG 75.00 ± 1.00 SEE NOTE 7
	223				228	
	224				229	
	225				230	
	226	WHT	24	16	231	
*	221	SHIELD				
	316	WHT	24	16	377	GROUP VII ATTACH FIND NO. 19 AND 49 LG 308.00 ± 2.00 SEE NOTE 7
	317	BLK			376	
	318	WHT	24	16	375	
	319				374	
	320				373	
	321				372	
	322				371	
	323				370	
	324				369	
	325				368	
	326				367	
	327				366	
	328				365	
	329				364	
	330				363	
	331				362	
	332				361	
	333				360	
	334				359	
	335				358	
	336				357	
	337				356	
	338				355	
	339				354	
	340				353	
	341				352	
	342				351	
	343				350	
	344				349	
	345				348	
	346	WHT	24	16	347	
		SHIELD			378	*

* ATTACH. FIND NO. 17 LG 6.00 ± .25

[illegible]

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 08131 DR CHK APPD	18 ... 69	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE 26
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

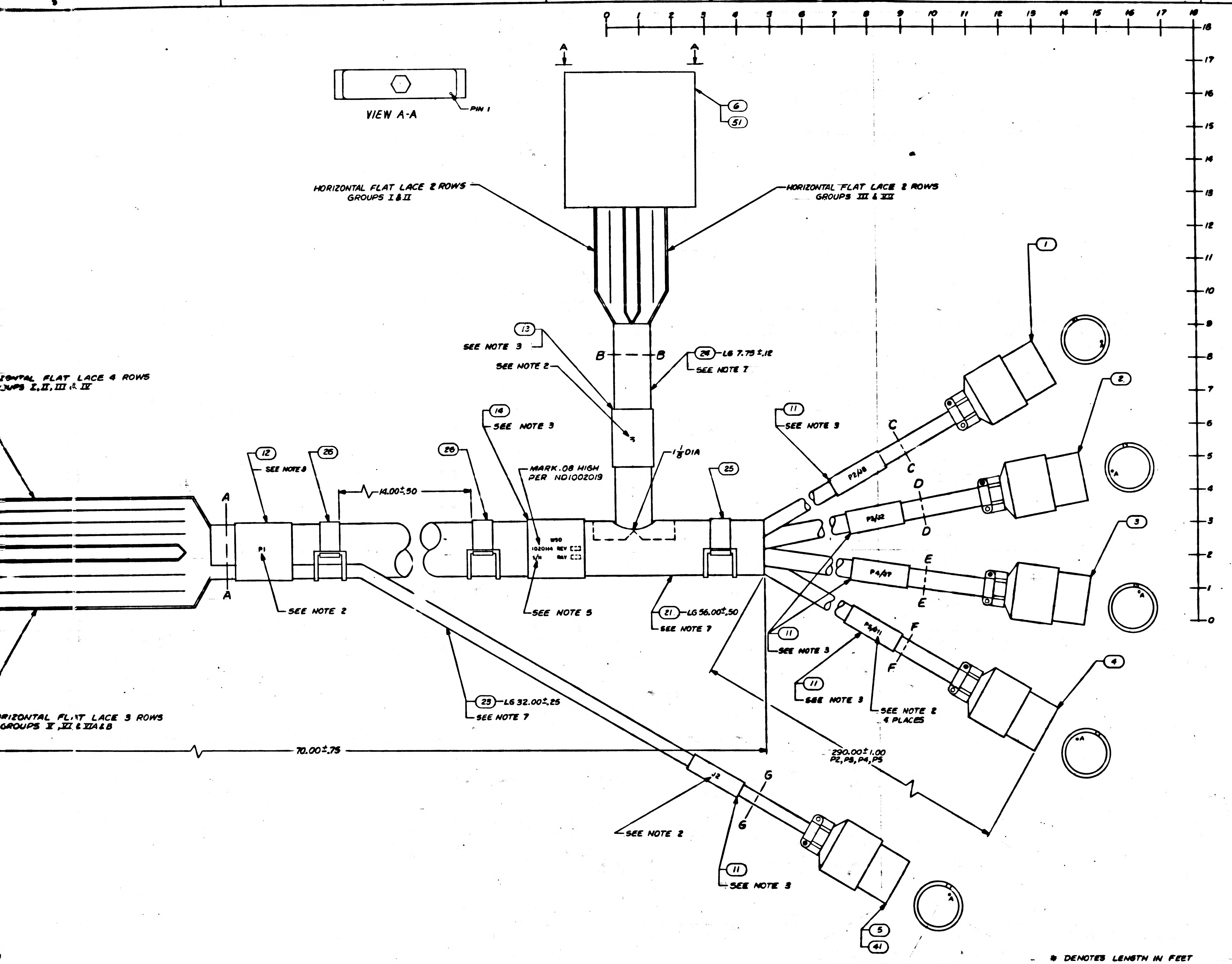
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020114
SCALE NONE WT SHEET 5 OF 5

1020114

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 0637	11 Feb 64	
A	CHANGED PER TDRR 08131 DR B Katina CHK APPD	15 MAY 64	KCS
B	CHANGED PER TDRR 10604 DR J McDaniel CHK JCJ APPD	23 June 64	JB



VIEW A-A
PIN 1
A
6
51
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & VII
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI & VIIA & B
13
SEE NOTE 3
SEE NOTE 2
B
28 LG 7.75 ±.12
SEE NOTE 7
1 1/8 DIA
14
SEE NOTE 3
MARK .08 HIGH PER ND1002019
W50 1020114 REV S/N
SEE NOTE 5
12
SEE NOTE 8
26
14.00 ±.50
28
25
P1
SEE NOTE 2
21 LG 56.00 ±.50
SEE NOTE 7
23 LG 32.00 ±.25
SEE NOTE 7
70.00 ±.75
11
SEE NOTE 3
P2/48
P3/32
P4/27
P5/11
C
D
E
F
G
1
2
3
4
5
41
SEE NOTE 2 4 PLACES
290.00 ±1.00 P2, P3, P4, P5
J2
SEE NOTE 2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 0637 DATE 11 Feb 64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1010402-2	SLEEVING SHRINK SOLDER	52
1	1006225-3	HOOD CONNECTOR	51
3	1000242-29	FERRULE ELEC CONDUCTOR	50
* ~~26.0~~	~~1006696-2~~	~~ZIPPER, TUBING~~	49
244	1010738-1	CONTACT, ELEC, PIN	48
244	1010738-2	CONTACT, ELEC, SOCKET	47
AR		CEMENT	46
* 0.2	SEE NOTE 6	INSULATION, SLEEVING	45
1	1000242-4	FERRULE, ELEC CONDUCTOR	44
1	1000243-7	FERRULE, ELEC CONDUCTOR	43
* 10	1006696-1	ZIPPER, TUBING	42
~~4~~		~~ADAPTER, SLEEVE~~	41
* 3.5	ND1002181 TYPE II CL4	WIRE, ELEC AWG 24 WHT&BLK	40
* 0.4	SEE NOTE 6	INSULATION SLEEVING	39
1	1000242-16	FERRULE, ELEC CONDUCTOR	38
1	1000243-14	FERRULE, ELEC CONDUCTOR	37
3	100243-33	FERRULE, ELEC CONDUCTOR	36
* 1.0	SEE NOTE 6	INSULATION SLEEVING	35
6	1000242-33	FERRULE, ELEC CONDUCTOR	34
6	1000243-37	FERRULE, ELEC CONDUCTOR	33
* 1.0	SEE NOTE 6	INSULATION SLEEVING	32
2	1000242-30	FERRULE, ELEC CONDUCTOR	31
2	1000243-34	FERRULE, ELEC CONDUCTOR	30
* 0.3	SEE NOTE 6	INSULATION SLEEVING	29
2	1000242-20	FERRULE, ELEC CONDUCTOR	28
2	1000243-15	FERRULE, ELEC CONDUCTOR	27
2	1006872-14	CLAMP, LOOP	26
1	1006872-13	CLAMP, LOOP	25
* 8.0	1006696-8	ZIPPER, TUBING	24
* 62.0	1006696-3	ZIPPER, TUBING	23
* 66.0	1006696-4	ZIPPER, TUBING	22
* 4.7	1006896-9	ZIPPER, TUBING	21
* 60.0	SEE NOTE 4	WIRE, BRAID	20
* 65.0	SEE NOTE 4	WIRE, BRAID	19
* 10.5	SEE NOTE 4	WIRE, BRAID	18
* 8.0	MIL-W-16878/4 E24 BLK	WIRE, ELEC	17
* 867.0	MIL-W-16878/4 E24, WHT	WIRE, ELEC	16
* 1700	1014341-12	WIRE, ELEC	15
1	1014472-9	BAND MARKER, CABLE	14
1	1014472-5A	BAND MARKER, CABLE	13
1	1014472-9A	BAND MARKER, CABLE	12
5	1014472-1A	BAND MARKER, CABLE	11
~~4~~	~~1006698~~	~~ADAPTER, SLEEVE~~	10
~~1~~		~~HOOD, CONNECTOR~~	9
1	1006225-1	HOOD, CONNECTOR	8
1	1010641-144	CONNECTOR	7
1	1006269-1	CONNECTOR	6
1	MS3124F-12-10S	CONNECTOR	5
1	MS3126F-24-61SZ	CONNECTOR	4
1	MS3126F-24-61SX	CONNECTOR	3
1	MS3126F-24-61SW	CONNECTOR	2
1	MS3126F-24-61SY	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

B	A	B	B	B
A	A	A	A	A
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN W. Carlson DATE
CHECKED R. Gagnon 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL
UNIT APPROVAL

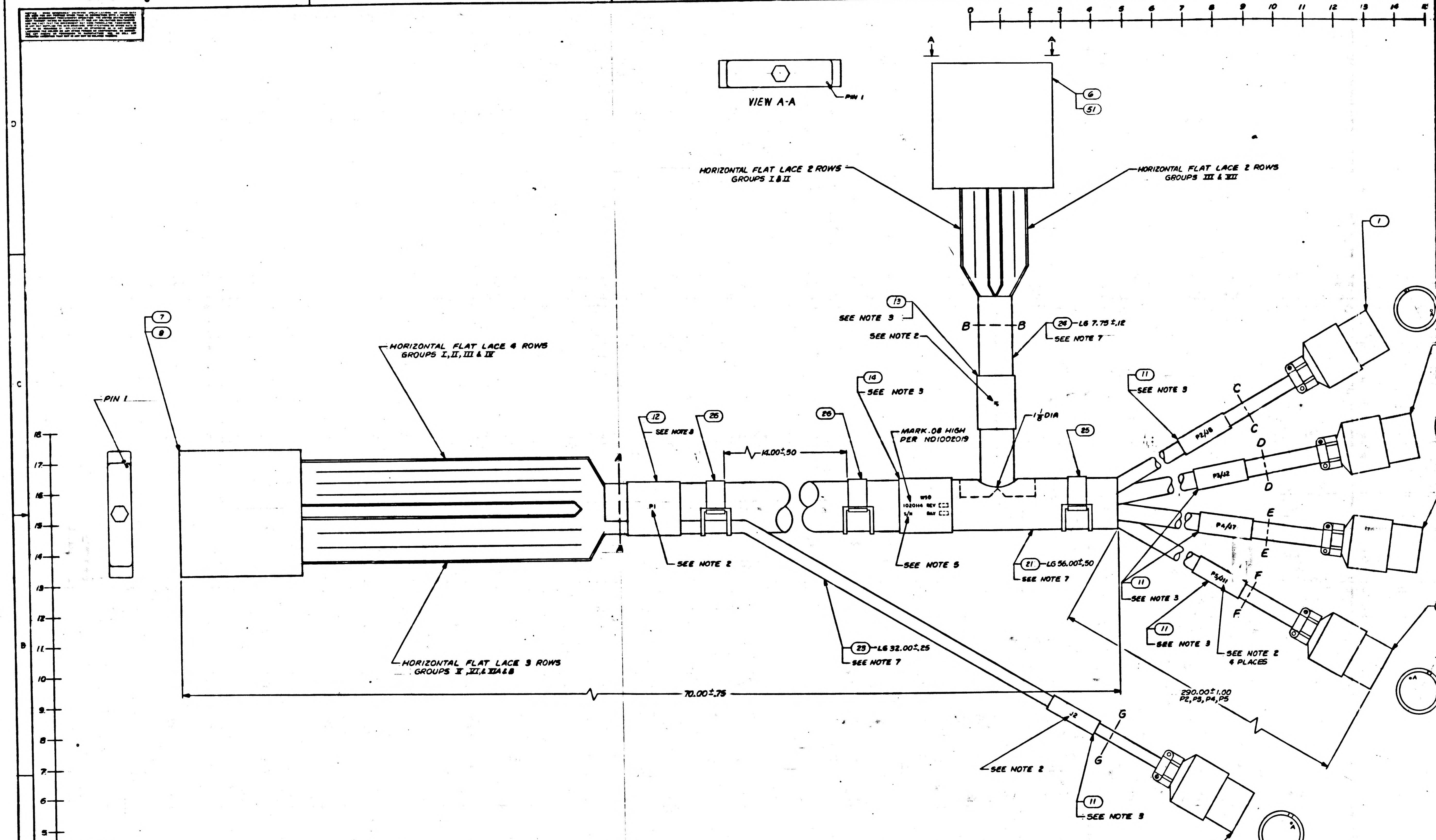
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020114
SCALE 1/1 WT SHEET 1 OF 5

1020114

2H


VIEW A-A
PIN 1
A
A
6
51
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & VII
1
13
SEE NOTE 3
SEE NOTE 2
B
B
24 - LG 7.75 ±.12
SEE NOTE 7
7
8
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
PIN 1
12
SEE NOTE 8
26
14.00 ±.50
26
14
SEE NOTE 3
MARK .08 HIGH PER ND1002019
1 1/8 DIA
25
11
SEE NOTE 3
C
C
D
D
P2/J8
P3/J2
P1
W50
1020114 REV
S/N BAY
SEE NOTE 2
SEE NOTE 5
21 - LG 56.00 ±.50
SEE NOTE 7
P4/J7
E
E
P5/J11
F
F
11
SEE NOTE 3
11
SEE NOTE 3
SEE NOTE 2 4 PLACES
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI, & VIIA & B
23 - LG 32.00 ±.25
SEE NOTE 7
70.00 ±.75
290.00 ±1.00 P2, P3, P4, P5
J2
G
G
SEE NOTE 2
11
SEE NOTE 3
5
41
A
A
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

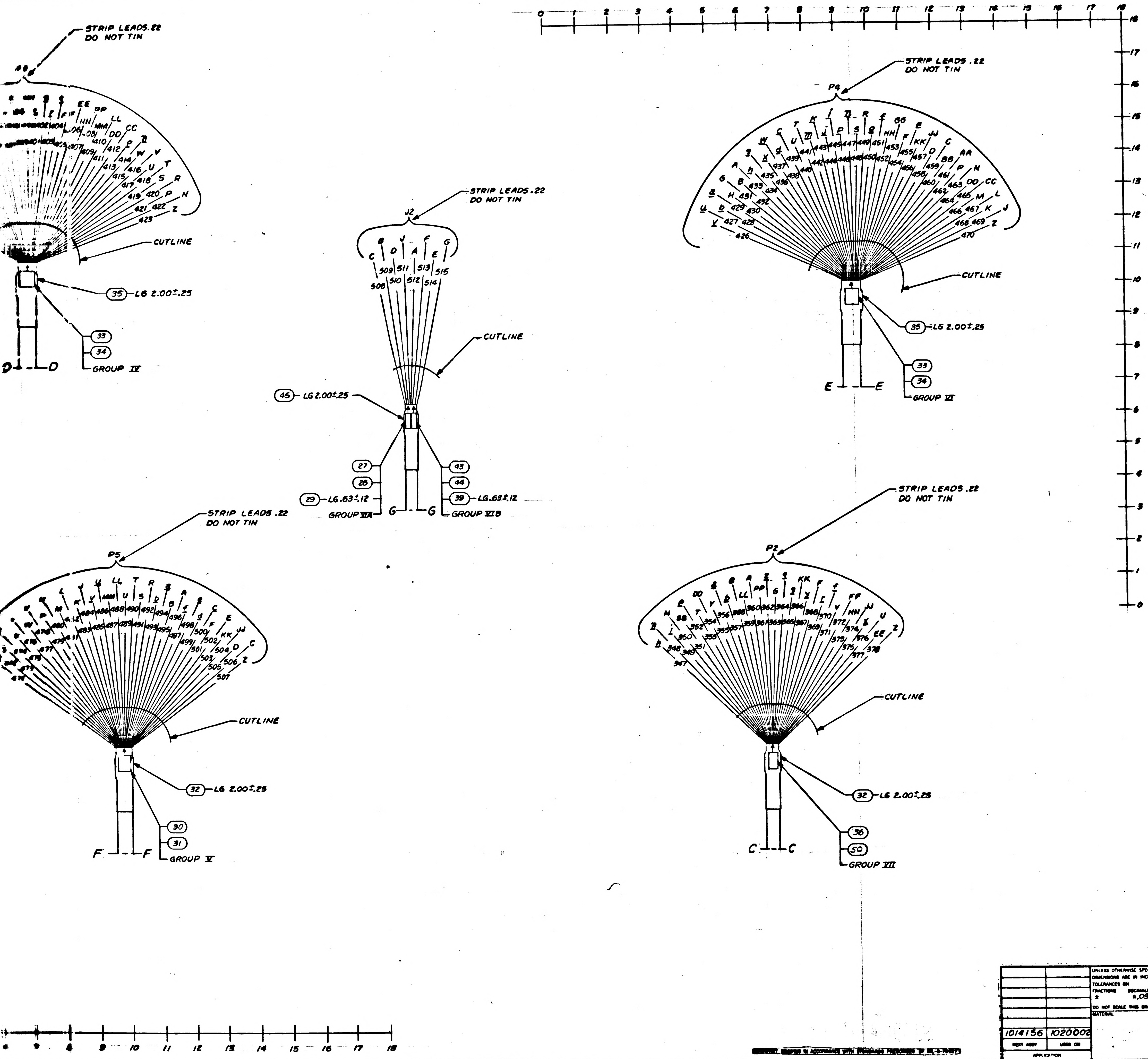
NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND 1002032
2. MARK .12 HIGH PER ND 1002019
3. BOND ~~FIND NO 11, 12, 13, AND 14~~ USING TETRAHYDROFURAN
WITH 10% POLYVINAL CHLORIDE
4. QQ-B-575 FOR FIND NO. 18 BRAID SIZE 1/8 FOR FIND NO. 19
BRAID SIZE 3/8 FOR FIND NO. 20 BRAID SIZE 1/2
5. MARK .08 HIGH PER ND 1002023
6. MIL-I-23053 CLASS I COLOR BLACK FOR FIND NO. 29 SIZE NO. 4,
FOR FIND NO. 32 SIZE NO. 7/16, FOR FIND NO. 35 SIZE NO. 1/2
FOR FIND NO. 39 SIZE NO. 6 FOR FIND NO. 45 SIZE NO. 5/8
7. SEAL FIND NO. 21, 22, 23, 24, & 42 WITH FIND NO. 46
~~8. DISCARD CONTACTS SUPPLIED WITH FIND NO 6 & 7~~
9. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

* DENOTES

B	A	B	B	B
A	A	A	A	A
—	—	—	—	—
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06317		
A	CHANGED PER TDRR 08131 DR BK CHK APPD	64	NCB
B	CHANGED PER TDRR 10604 DR J J CHK J C J APPD	64	



STRIP LEADS .22 DO NOT TIN
P3
CUTLINE
35 — LG 2.00 ± .25
33
34
GROUP IV
D — D
J2
STRIP LEADS .22 DO NOT TIN
CUTLINE
45 — LG 2.00 ± .25
27
28
29 — LG .63 ± .12
GROUP VII A
G — G
43
44
39 — LG .63 ± .12
GROUP VII B
P4
STRIP LEADS .22 DO NOT TIN
CUTLINE
35 — LG 2.00 ± .25
33
34
GROUP VI
E — E
P5
STRIP LEADS .22 DO NOT TIN
CUTLINE
32 — LG 2.00 ± .25
30
31
GROUP V
F — F
P2
STRIP LEADS .22 DO NOT TIN
CUTLINE
32 — LG 2.00 ± .25
36
50
GROUP VII
C — C

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/4/64

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

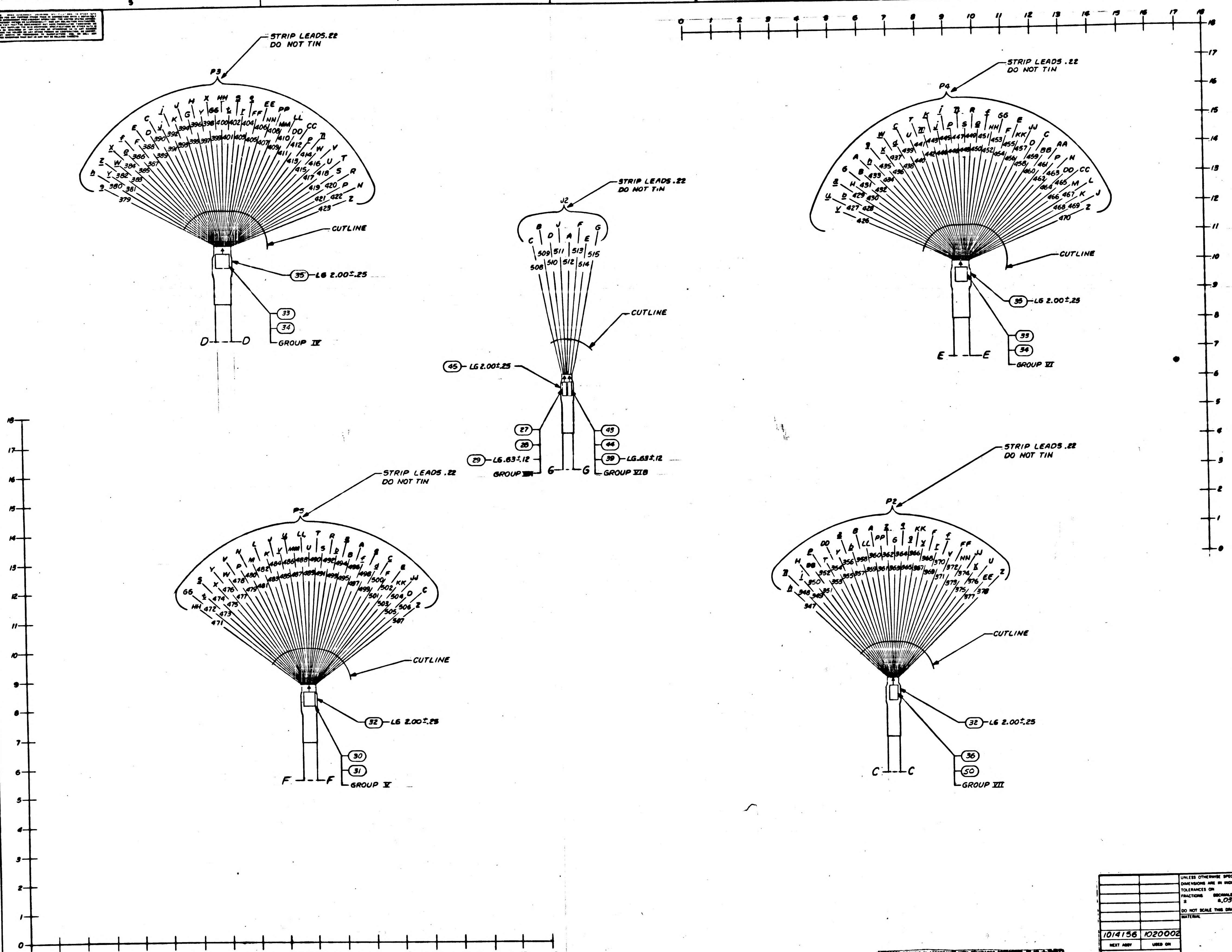
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO. —— SIZE J NASA DRAWING NO 1020114
SCALE 1/1 WT SHEET 3 OF 5

1020114

1020114 - 1 2722


STRIP LEADS .22
DO NOT TIN
P3
CUTLINE
35 — LG 2.00±.25
33
34
GROUP IV
D — D
J2
STRIP LEADS .22
DO NOT TIN
CUTLINE
45 — LG 2.00±.25
27
28
29 — LG .63±.12
GROUP
G — G
43
44
39 — LG .63±.12
GROUP VIB
P4
STRIP LEADS .22
DO NOT TIN
CUTLINE
35 — LG 2.00±.25
33
34
E — E
GROUP VI
P5
STRIP LEADS .22
DO NOT TIN
CUTLINE
32 — LG 2.00±.25
30
31
F — F
GROUP V
P2
STRIP LEADS .22
DO NOT TIN
CUTLINE
32 — LG 2.00±.25
36
50
C — C
GROUP VII

FOR INFORMATION
CLASS B RELEASE TI

SYM	
—	CL B REL
A	CHANGED P DR BK
B	CHANGED PER DR

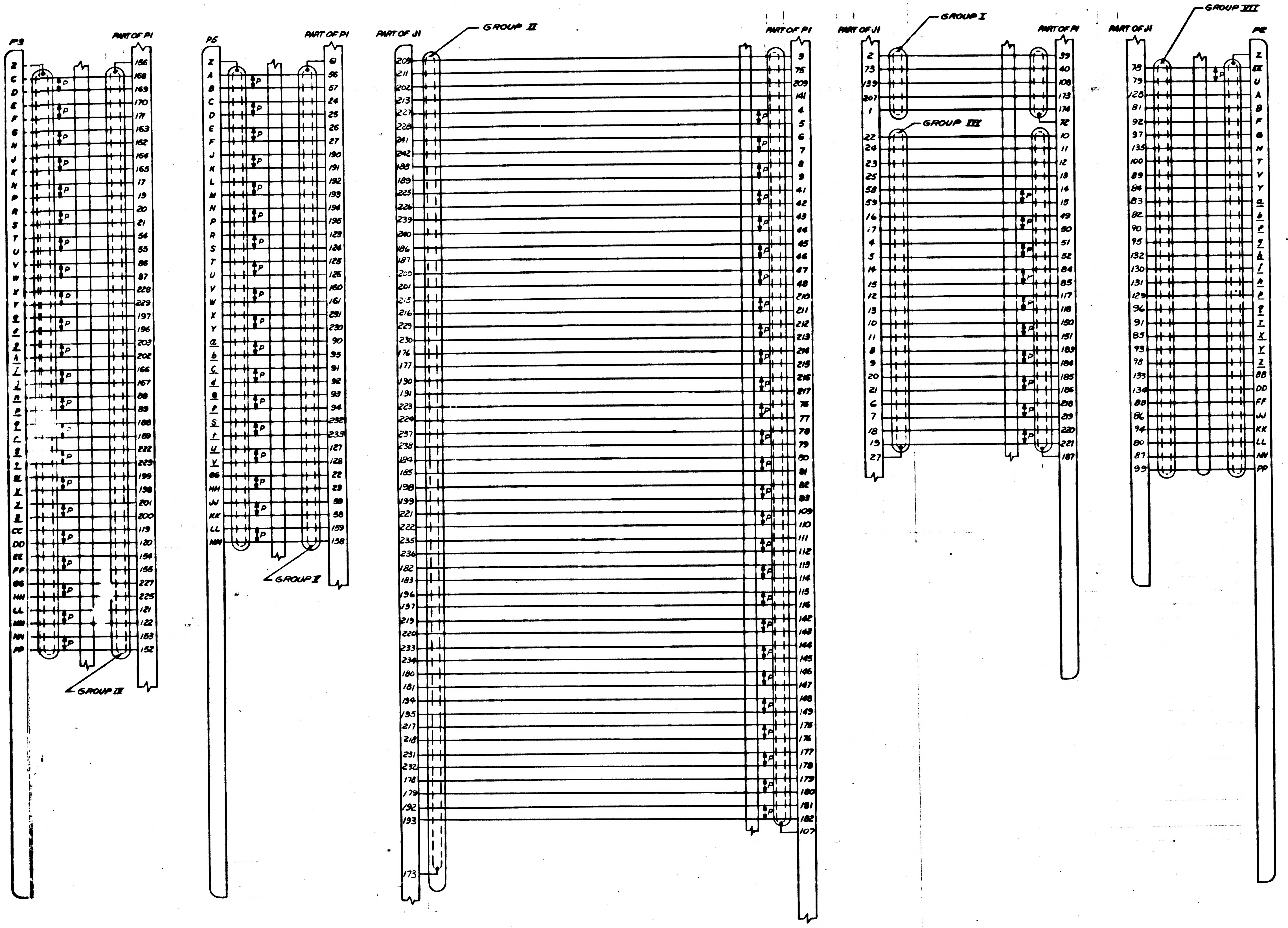
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

QTY REQD — PART OR IDENTIFYING NO

RAYTHEON CO
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN V. Carlson DATE
CHECKED
APPROV.
APPROV.
APPROV.
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06317	11	
A	CHANGED PER TDRR 08131 DR. CHK. APPD	18 MAY 64	
B	CHANGED PER TDRR 10604 DR CHK. JCJ APPD	MAY 64	



P3
PART OF P1
GROUP II
P5
PART OF P1
GROUP X
PART OF J1
GROUP II
PART OF P1
PART OF J1
GROUP I
GROUP III
PART OF P1
PART OF J1
GROUP VII
P2
P

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO 06317 DATE

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

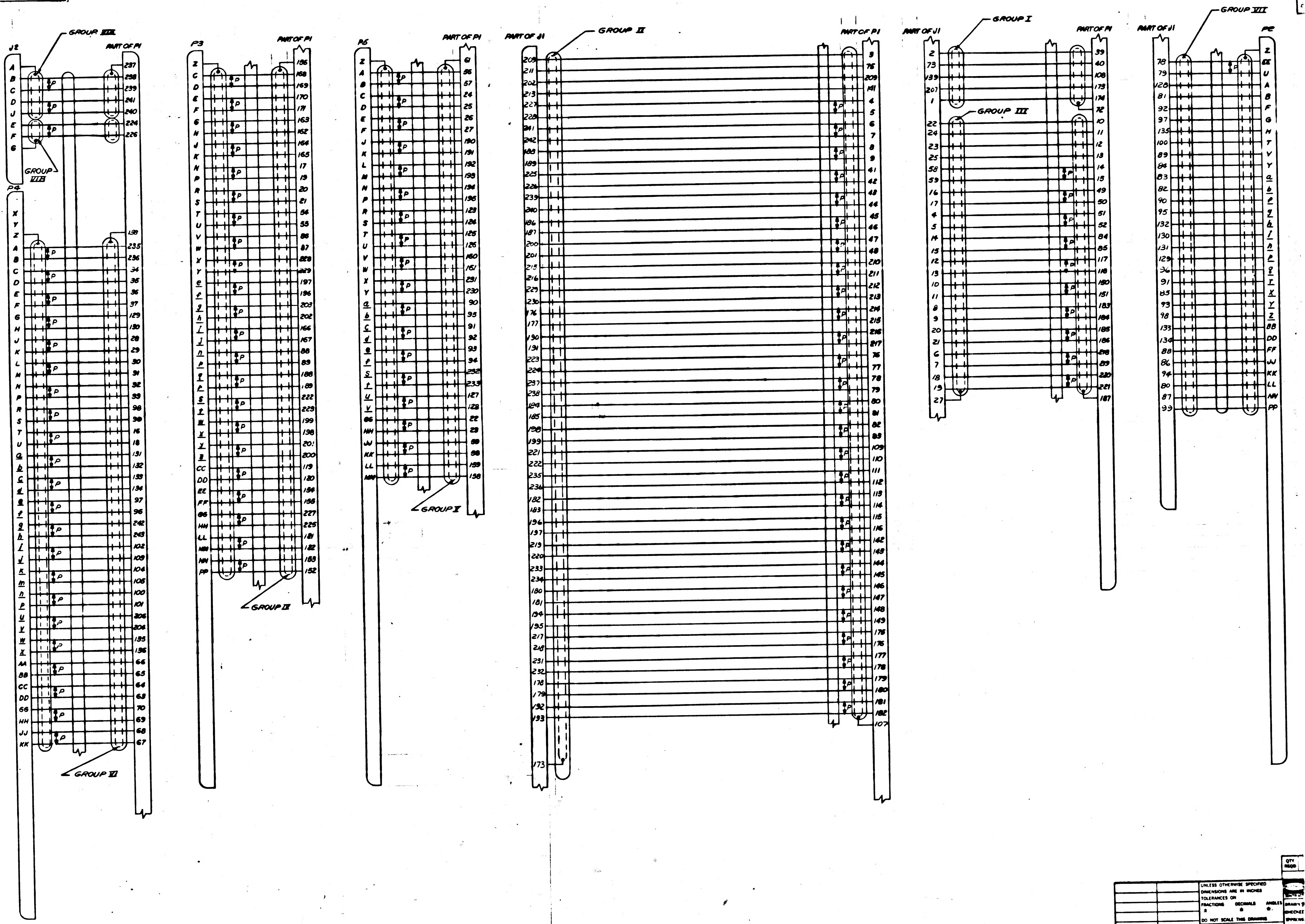
CODE IDENT NO —— SIZE J NASA DRAWING NO 1020114
SCALE NONE WT SHEET 4 OF 5

1020114

1020114

1020114 - 1 - 2/2

A110501


J2
PART OF P1
GROUP VIII
GROUP VII
P4
GROUP VI
P3
PART OF P1
GROUP IV
P5
PART OF P1
GROUP V
PART OF J1
GROUP II
PART OF P1
PART OF J1
GROUP I
GROUP III
PART OF P1
PART OF J1
GROUP VII
P2
P

CL B RELE
CHANGED DR
CHANGED PER DR

FOR INF
CLASS B RELE

MASTER

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD | PART OR IDENTIFYING NO

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
CHECKED
APPROVAL
NASA AP
MIT APP
MIT APP

1020114

1020114 1/2

ASSEMBLY INFORMATION CHART

FROM	DESCRIPTION				TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS

GROUP V ATTACH FIND NO. 18 AND 24 LG [illegible] SEE NOTE 7

GROUP II ATTACH FIND NO. 20 AND 21 LG [illegible] SEE NOTE 7

ASSEMBLY INFORMATION CHART

FROM	DESCRIPTION				TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS

GROUP IV ATTACH FIND NO. 23 AND 22 LG [illegible] SEE NOTE 7

GROUP III ATTACH FIND NO. 19 AND 18 LG [illegible] SEE NOTE 7

GROUP II ATTACH FIND NO. 20 AND 21 LG [illegible] SEE NOTE 7

ASSEMBLY INFORMATION CHART

FROM	DESCRIPTION				TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS

GROUP I ATTACH FIND NO. 18 AND [illegible] 4 [illegible]

GROUP III ATTACH FIND NO. 18 AND [illegible] L.G. [illegible] SEE NOTE 7

FOR INFORMATION ONLY
CLASS B RELEASE [illegible] NO. [illegible] DATE [illegible]

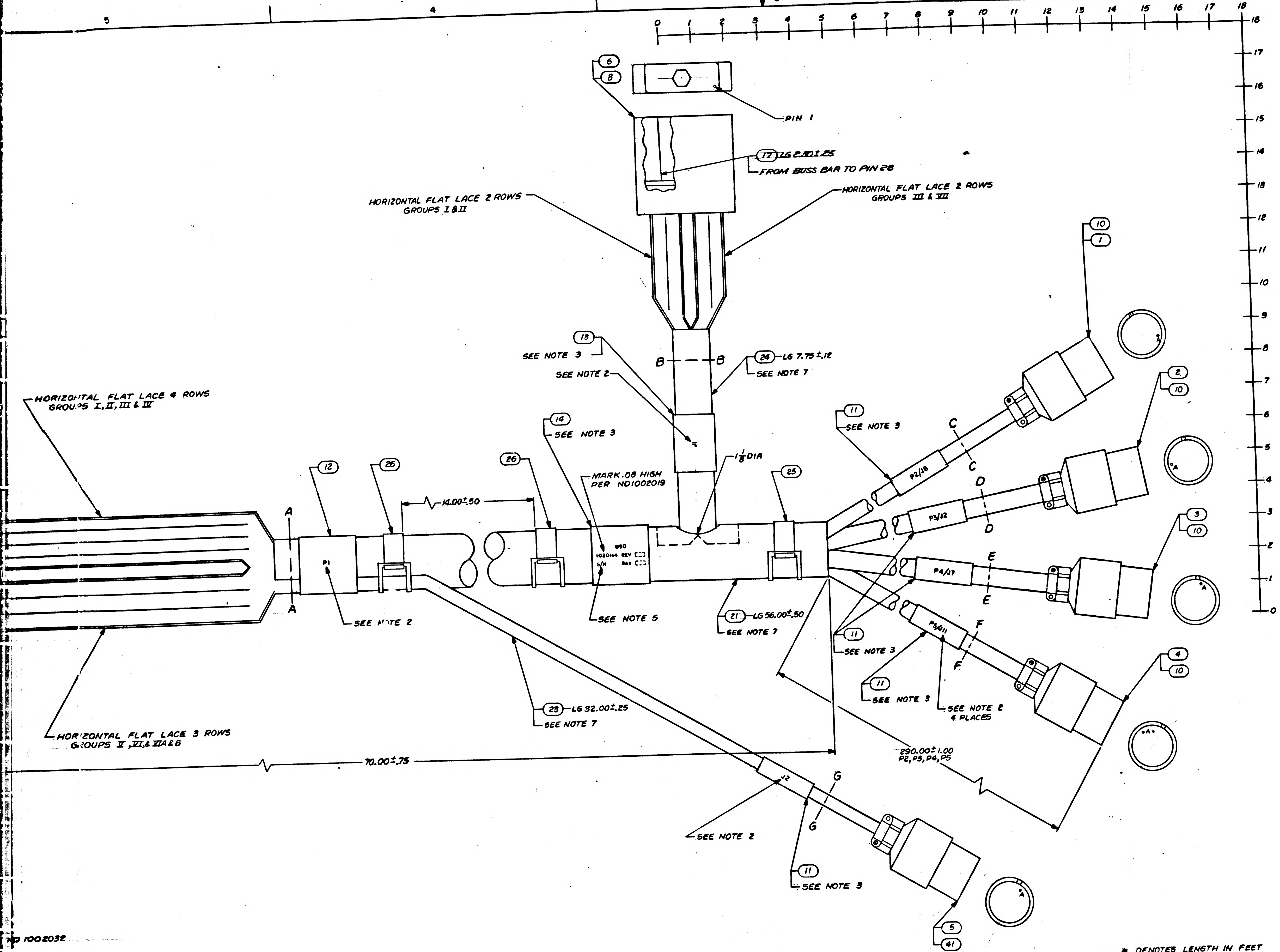
CABLE ASSEMBLY, ELECTRICAL
[illegible] TEST CABLE

J

KC2ONH4

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]

REVISIONS


PIN 1
⑥
⑧
⑰ LG 2.50 ± .25
FROM BUSS BAR TO PIN 28
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & VII
⑬ SEE NOTE 3
SEE NOTE 2
B
B
㉔ LG 7.75 ± .12 SEE NOTE 7
1 1/8 DIA
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI, & VIA & B
A
A
⑫
㉖
14.00 ± .50
⑭ SEE NOTE 3
㉖
MARK .08 HIGH PER ND1002019
W50 1020114 REV S/N RAY
P1
SEE NOTE 2
SEE NOTE 5
㉕
㉑ LG 56.00 ± .50 SEE NOTE 7
㉓ LG 32.00 ± .25 SEE NOTE 7
70.00 ± .75
⑪ SEE NOTE 3
⑩
①
P2/18
C
C
②
⑩
P3/32
D
D
③
⑩
P4/37
E
E
P5/41
F
F
④
⑩
⑪ SEE NOTE 3
⑪ SEE NOTE 3
SEE NOTE 2 4 PLACES
290.00 ± 1.00 P2, P3, P4, P5
J2
G
G
SEE NOTE 2
⑪ SEE NOTE 3
⑤
㊶
A
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

ND 1002032

OTURAN

FIND NO. 19

NO. 29 SIZE NO. 4,
IZE NO. 1/2
NO. 5/8

6 & 7
UANTITIES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE [illegible]

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
244	1010738-1	CONTACT, ELEC, PIN	48
88	1010738-2	CONTACT, ELEC, SOCKET	47
AR		CEMENT	46
* 0.2	SEE NOTE 6	INSULATION, SLEEVING	45
1	1000242-11	FERRULE, ELEC CONDUCTOR	44
1	1000243-7	FERRULE, ELEC CONDUCTOR	43
* 10	1006696-1	ZIPPER, TUBING	42
1		ADAPTER, SLEEVE	41
* 3.5	ND1002181 TYPE II CL4	WIRE, ELEC AWG 24 WHT & BLK	40
* 0.4	SEE NOTE 6	INSULATION SLEEVING	39
1	1000242-16	FERRULE, ELEC CONDUCTOR	38
1	1000243-14	FERRULE, ELEC CONDUCTOR	37
3	100243-33	FERRULE, ELEC CONDUCTOR	36
* 1.0	SEE NOTE 6	INSULATION SLEEVING	35
6	1000242-33	FERRULE, ELEC CONDUCTOR	34
6	1000243-37	FERRULE, ELEC CONDUCTOR	33
* 1.0	SEE NOTE 6	INSULATION SLEEVING	32
5	1000242-30	FERRULE, ELEC CONDUCTOR	31
2	1000243-34	FERRULE, ELEC CONDUCTOR	30
* 0.3	SEE NOTE 6	INSULATION SLEEVING	29
2	1000242-20	FERRULE, ELEC CONDUCTOR	28
2	1000243-15	FERRULE, ELEC CONDUCTOR	27
2	1006872-14	CLAMP, LOOP	26
1	1006872-13	CLAMP, LOOP	25
* 8.0	1006696-7	ZIPPER, TUBING	24
* 36.0	1006696-2	ZIPPER, TUBING	23
* 72.0	1006696-3	ZIPPER, TUBING	22
* 4.7	1006896-9	ZIPPER, TUBING	21
* 60.0	SEE NOTE 4	WIRE, BRAID	20
* 65.0	SEE NOTE 4	WIRE, BRAID	19
* 10.5	SEE NOTE 4	WIRE, BRAID	18
* 8.0	MIL-W-16878/4 E24, BLK	WIRE, ELEC	17
* 867.0	MIL-W-16878/4 E24, WHT	WIRE, ELEC	16
* 1700	1014341-12	WIRE, ELEC	15
1	1014472-9	BAND MARKER, CABLE	14
1	1014472-5A	BAND MARKER, CABLE	13
1	1014472-9A	BAND MARKER, CABLE	12
5	1014472-1A	BAND MARKER, CABLE	11
4	1006698	ADAPTER, SLEEVE	10
1		HOOD, CONNECTOR	9
1		HOOD, CONNECTOR	8
1	1010641-1	CONNECTOR	7
1	1006690	CONNECTOR	6
1	MS3124E-12-10S	CONNECTOR	5
1	MS3126E-24-61SZ	CONNECTOR	4
1	MS3126E-24-61SX	CONNECTOR	3
1	MS3126E-24-61SW	CONNECTOR	2
1	MS3126E-24-61SY	CONNECTOR	1

LIST OF MATERIALS

1020114

* DENOTES LENGTH IN FEET

—	—	—	—	—
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE [illegible]
CHECKED R. Caggiano 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL [illegible] 2/11/64

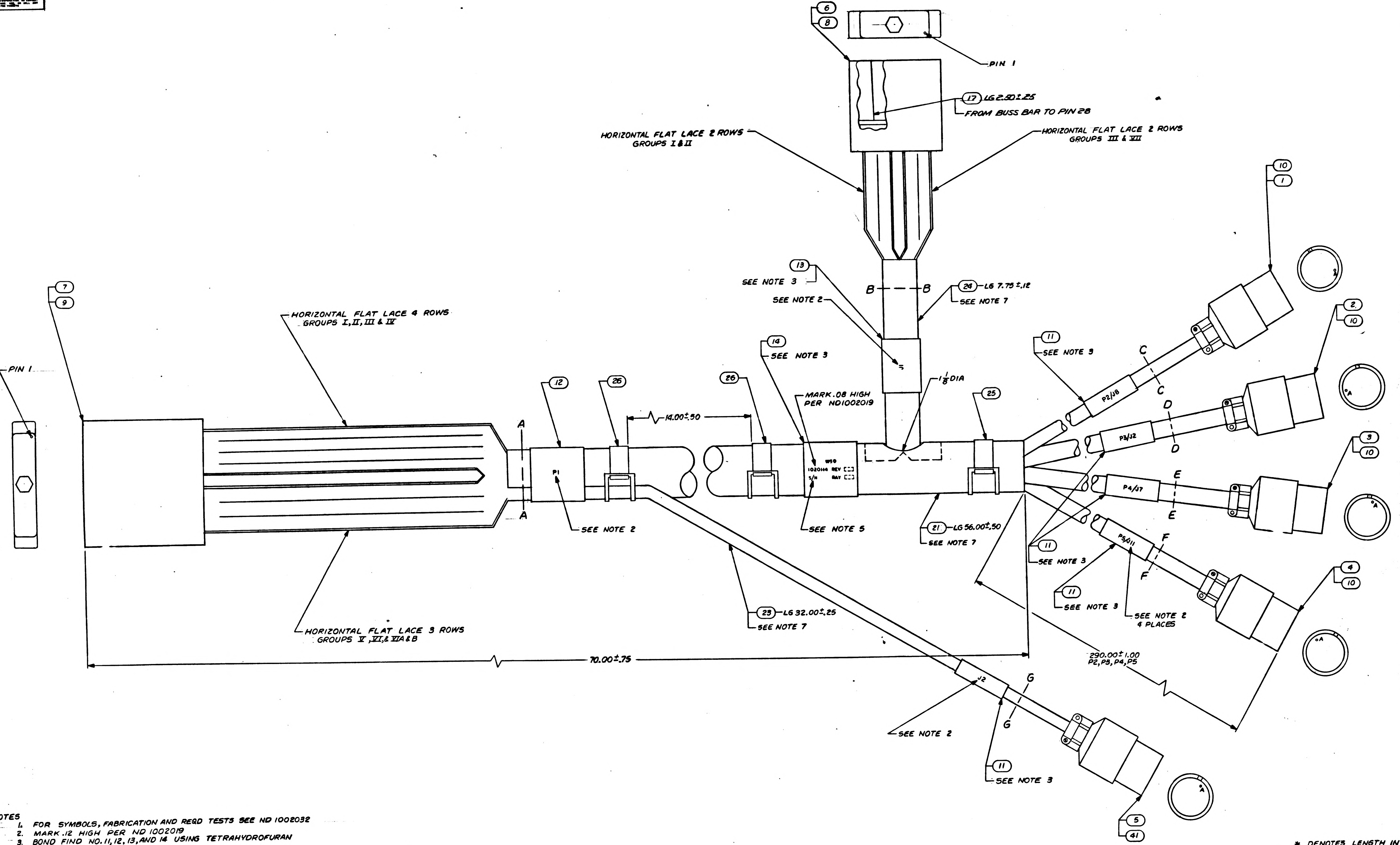
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020114
SCALE 1/1 WT SHEET 1 OF 5

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


6
8
PIN 1
17 LG 2.50±.25
FROM BUSS BAR TO PIN 28
HORIZONTAL FLAT LACE 2 ROWS GROUPS I & II
HORIZONTAL FLAT LACE 2 ROWS GROUPS III & VII
10
1
13
SEE NOTE 3
SEE NOTE 2
B
B
24 LG 7.75±.12
SEE NOTE 7
2
10
7
9
HORIZONTAL FLAT LACE 4 ROWS GROUPS I, II, III & IV
PIN 1
14
SEE NOTE 3
11
SEE NOTE 3
C
C
12
26
26
1 1/8 DIA
25
MARK .08 HIGH PER ND1002019
D
D
P2/J8
P3/J2
3
10
A
A
14.00±.50
W50
1020114 REV
S/N RAY
P1
P4/J7
E
E
SEE NOTE 2
SEE NOTE 5
21 LG 56.00±.50
SEE NOTE 7
11
SEE NOTE 3
P5/J11
F
F
11
SEE NOTE 3
SEE NOTE 2 4 PLACES
4
10
HORIZONTAL FLAT LACE 3 ROWS GROUPS V, VI, & VIA & B
23 LG 32.00±.25
SEE NOTE 7
70.00±.75
290.00±1.00 P2, P3, P4, P5
J2
G
G
SEE NOTE 2
11
SEE NOTE 3
5
41
A
A
A
A

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND 1002032
2. MARK .12 HIGH PER ND 1002019
3. BOND FIND NO. 11, 12, 13, AND 14 USING TETRAHYDROFURAN WITH 10% POLYVINAL CHLORIDE
4. QQ-B-575 FOR FIND NO. 18 BRAID SIZE 1/8 FOR FIND NO. 19 BRAID SIZE 3/8 FOR FIND NO. 20 BRAID SIZE 1/2
5. MARK .08 HIGH PER ND 1002023
6. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 29 SIZE NO. 4, FOR FIND NO. 32 SIZE NO. 7/16, FOR FIND NO. 35 SIZE NO. 1/2 FOR FIND NO. 39 SIZE NO. 6 FOR FIND NO. 45 SIZE NO. 5/8
7. SEAL FIND NO. 21, 22, 23, 24, & 42 WITH FIND NO. 46
8 DISCARD CONTACTS SUPPLIED WITH FIND NO 6 & 7
9. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

* DENOTES LENGTH IN FEET

—	—	—	—	—
SH 1	SH 2	SH 3	SH 4	SH 5

REVISION STATUS OF SHEETS

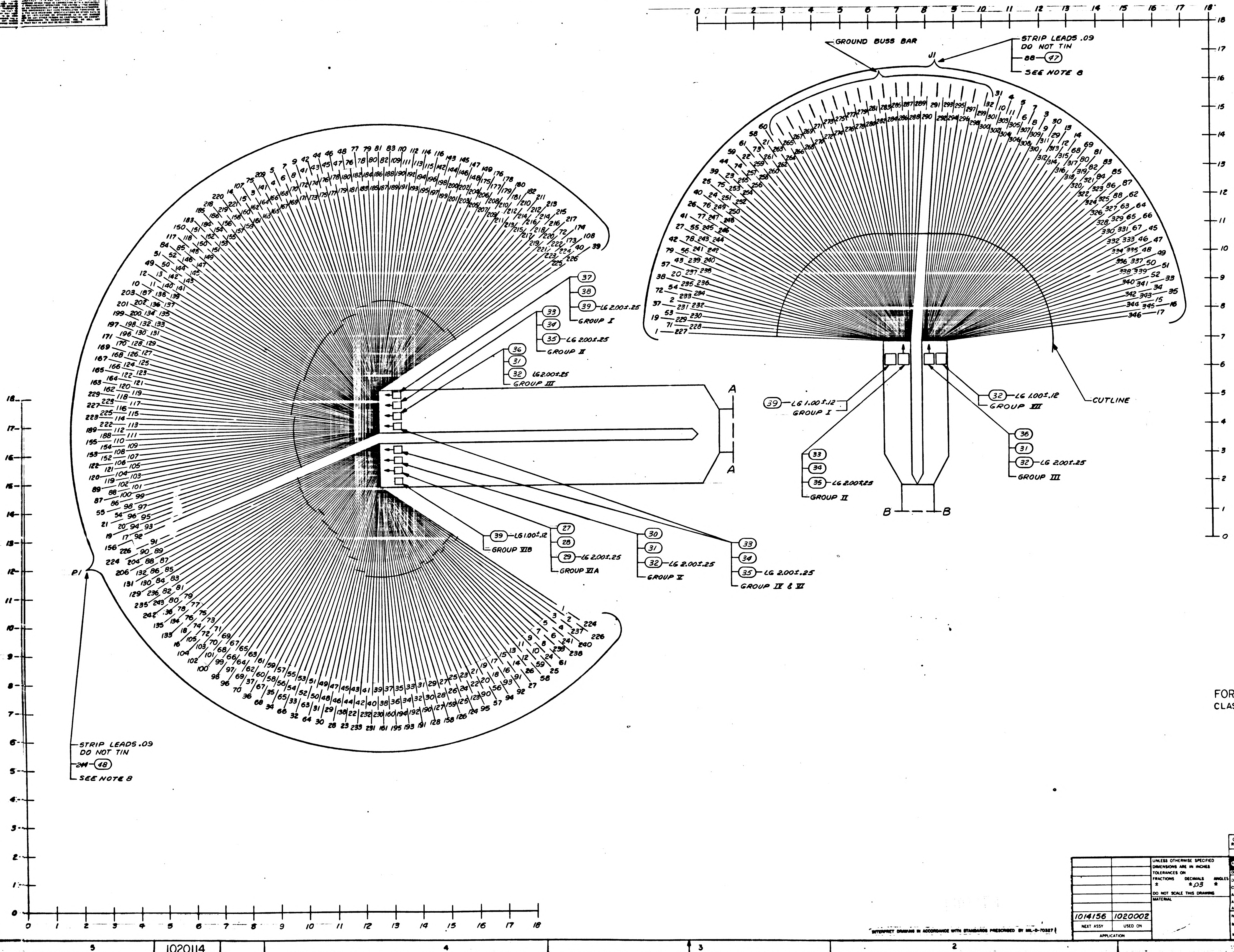
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE [illegible]
DIMENSIONS ARE [illegible]
TOLERANCES ON
FRACTIONS DECIMALS
±
DO NOT SCALE THIS [illegible]
MATERIAL

INCHES
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


GROUND BUSS BAR
J1
STRIP LEADS .09
DO NOT TIN
88 — 47
SEE NOTE 8
CUTLINE
A — A
B — B
39 — LG 1.00±.12 GROUP I
32 — LG 1.00±.12 GROUP VII
33, 34, 35 — LG 2.00±.25 GROUP II
36, 31, 32 — LG 2.00±.25 GROUP III
37, 38, 39 — LG 2.00±.25 GROUP I
33, 34, 35 — LG 2.00±.25 GROUP II
36, 31, 32 — LG 2.00±.25 GROUP III
39 — LG 1.00±.12 GROUP VIB
27, 28, 29 — LG 2.00±.25 GROUP VIA
30, 31, 32 — LG 2.00±.25 GROUP V
33, 34, 35 — LG 2.00±.25 GROUP IV & VI
P1
STRIP LEADS .09
DO NOT TIN
244 — 48
SEE NOTE 8
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 063 DATE 2/14/64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

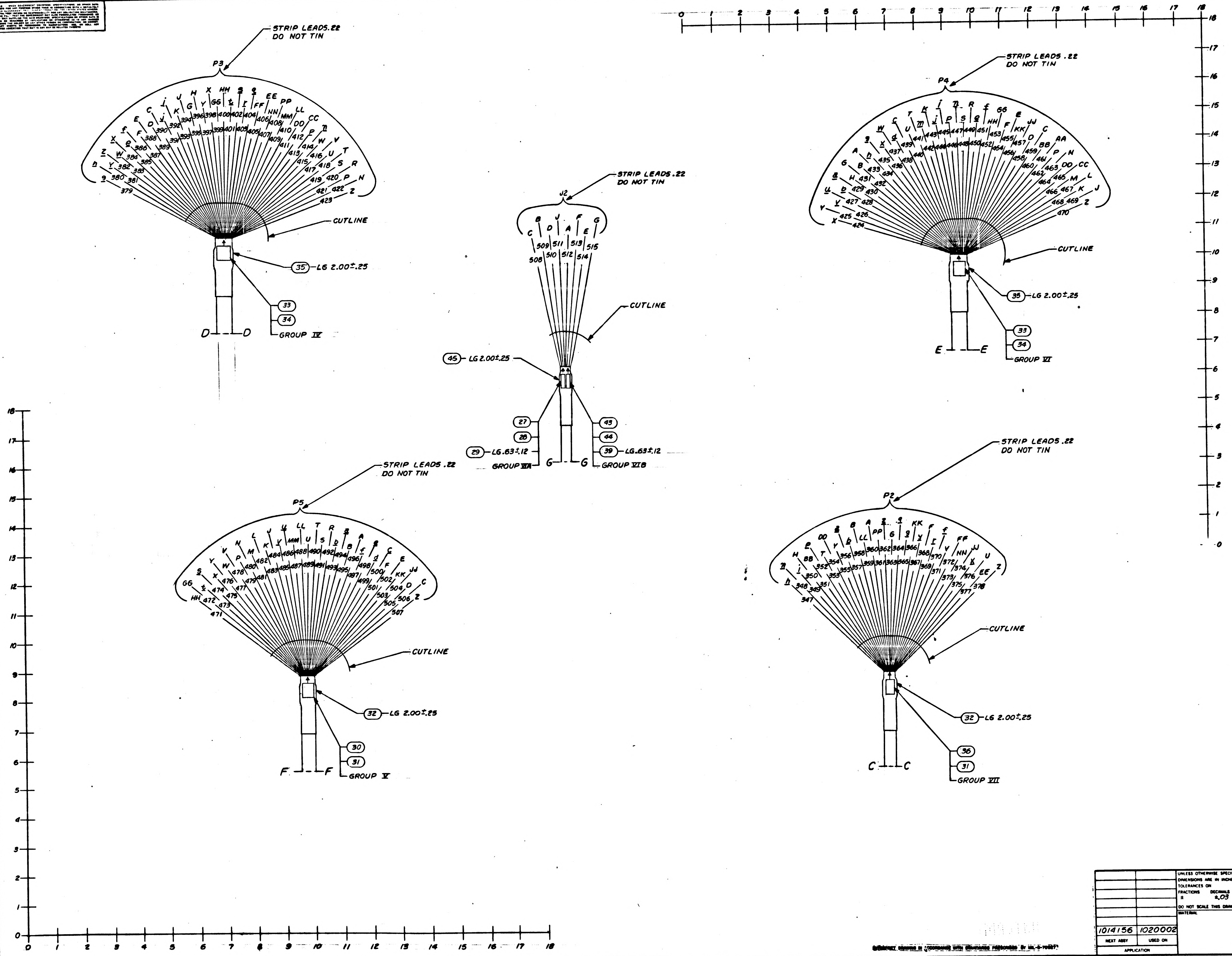
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE 23DEC63
CHECKED A. Wagner 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2/11/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO — SIZE J NASA DRAWING NO 1020114
SCALE 1/1 WT SHEET 2 OF 5

SYM	REVISIONS DESCRIPTION	DATE	APPD
—	CL B RELEASED PER TDRR [illegible]	[illegible]	



STRIP LEADS .22
DO NOT TIN
P3
CUTLINE
35 LG 2.00±.25
33
34
GROUP IV
D — D
STRIP LEADS .22
DO NOT TIN
J2
CUTLINE
45 LG 2.00±.25
27
28
29 LG .63±.12
GROUP VIIA
G — G
43
44
39 LG .63±.12
GROUP VIIB
STRIP LEADS .22
DO NOT TIN
P4
CUTLINE
35 LG 2.00±.25
33
34
GROUP VI
E — E
STRIP LEADS .22
DO NOT TIN
P5
CUTLINE
32 LG 2.00±.25
30
31
GROUP V
F — F
STRIP LEADS .22
DO NOT TIN
P2
CUTLINE
32 LG 2.00±.25
36
31
GROUP VII
C — C

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
LIST OF MATERIALS		

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H Carlson DATE
CHECKED 13 Jan 64
APPROVAL C. Sanders
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

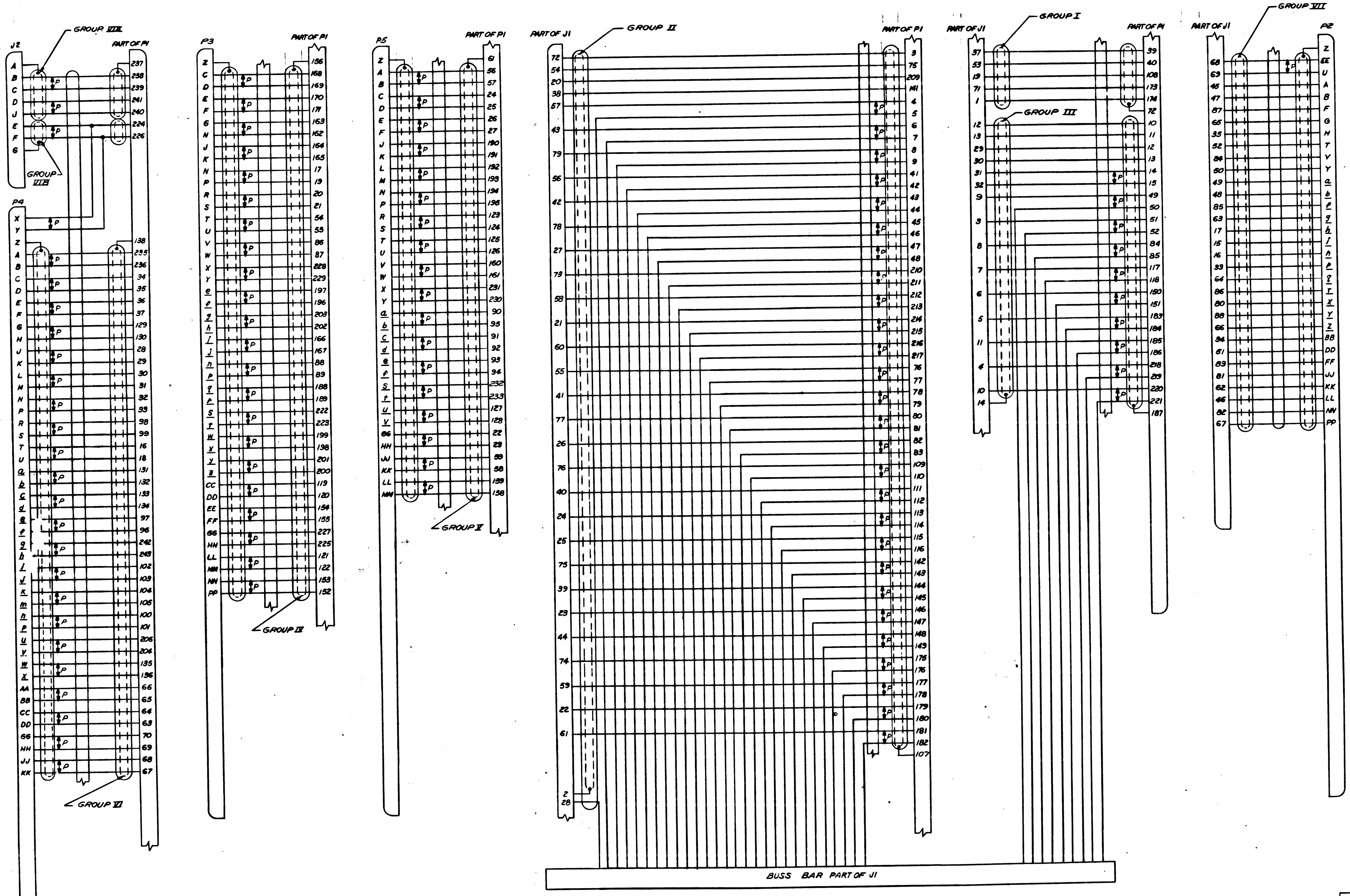
CABLE ASSEMBLY ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020114
SCALE 1/1
WT
SHEET

1020114

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		



GROUP VIII
J2
A B C D J E F G
PART OF P1
237 238 239 241 240 224 226
GROUP VII
P4
X Y Z A B C D E F G H J K L M N P R S T U a b c d e f g h i j k m n p u v w x AA BB CC DD GG HH JJ KK
138 235 236 34 35 36 37 129 130 28 29 30 31 32 33 98 99 16 18 131 132 133 134 97 96 242 243 102 103 104 105 100 101 206 204 135 136 66 65 64 63 70 69 68 67
GROUP VI
P3
Z C D E F G H J K N P R S T U V W X Y e f g h i j n p q r s t w y z CC DD EE FF GG HH LL MM NN PP
PART OF P1
156 168 169 170 171 163 162 164 165 17 19 20 21 54 55 86 87 228 229 197 196 203 202 166 167 88 89 188 189 222 223 199 198 201 200 119 120 154 155 227 225 121 122 153 152
GROUP IV
P5
Z A B C D E F J K L M N P R S T U V W X Y a b c d e f s t u v BB HH JJ KK LL MM
PART OF P1
61 56 57 24 25 26 27 190 191 192 193 194 195 123 124 125 126 150 151 231 230 90 95 91 92 93 94 232 233 127 128 22 23 59 58 159 158
GROUP V
PART OF J1
GROUP II
72 54 20 38 57 43 79 56 42 78 27 73 58 21 60 55 41 77 26 76 40 24 25 75 39 23 44 74 59 22 61 2 28
PART OF P1
3 75 209 141 4 5 6 7 8 9 41 42 43 44 45 46 47 48 210 211 212 213 214 215 216 217 76 77 78 79 80 81 82 83 109 110 111 112 113 114 115 116 142 143 144 145 146 147 148 149 175 176 177 178 179 180 181 182 107
PART OF J1
GROUP I
37 53 19 71 1
GROUP III
12 13 29 30 31 32 9 8 7 6 5 11 4 10 14
PART OF P1
39 40 108 173 174 72 10 11 12 13 14 15 49 50 51 52 84 85 117 118 150 151 183 184 185 186 218 219 220 221 187
PART OF J1
GROUP VII
68 69 45 47 87 65 35 52 84 50 49 48 85 63 17 15 16 33 64 86 80 88 66 34 81 89 81 62 46 82 67
P2
Z EE U A B F G H T V Y a b e g h i n p q r x y z BB DD FF JJ KK LL NN PP
P
BUSS BAR PART OF J1

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO. 06317 DATE 2/4/64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

CODE IDENT NO —— SIZE J NASA DRAWING NO 1020114

SCALE NONE WT SHEET 4 OF 5

1020114

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
**90	1	WHT	24	40	514	GROUP VII B
**91	2	BLK			513	
		SHIELD			515	*
	4	WHT	24	15	511	GROUP VIIA ATTACH FIND NO. 18 & 42 LG 35.00 ± .50 * SEE NOTE 7
	5	BLK			510	
	6	WHT	24	15	509	
	7	BLK			508	
*	3	SHIELD			512	
	9	WHT	24	15	506	GROUP V ATTACH FIND NO. 19 AND 22 LG 354.00 ± 2.00 SEE NOTE 7
	10	BLK			505	
	11	WHT	24	15	504	
	12	BLK			503	
	13	WHT	24	15	502	
	14	BLK			501	
	15	WHT	24	15	500	
	16	BLK			499	
	17	WHT	24	15	498	
	18	BLK			497	
	19	WHT	24	15	496	
	20	BLK			495	
	21	WHT	24	15	494	
	22	BLK			493	
	23	WHT	24	15	492	
	24	BLK			491	
	25	WHT	24	15	490	
	26	BLK			489	
	27	WHT	24	15	488	
	28	BLK			487	
	29	WHT	24	15	486	
	30	BLK			485	
	31	WHT	24	15	484	
	32	BLK			483	
	33	WHT	24	15	482	
	34	BLK			481	
	35	WHT	24	15	480	
	36	BLK			479	
	37	WHT	24	15	478	
	38	BLK			477	
	39	WHT	24	15	476	
	40	BLK			475	
	41	WHT	24	15	474	
	42	BLK			473	
	43	WHT	24	15	472	
	44	BLK			471	
*	8	SHIELD			507	*
	46	WHT	24	15	469	GROUP VI ATTACH FIND NO. 20 AND 22 LG 354.00 ± 2.00 SEE NOTE 7
	47	BLK			468	
	48	WHT	24	15	467	
	49	BLK			466	
	50	WHT	24	15	465	
	51	BLK			464	
	52	WHT	24	15	463	
	53	BLK			462	
	54	WHT	24	15	461	
	55	BLK			460	
	56	WHT	24	15	459	
	57	BLK			458	
	58	WHT	24	15	457	
	59	BLK			456	
	60	WHT	24	15	455	
	61	BLK			454	
	62	WHT	24	15	453	
	63	BLK			452	
	64	WHT	24	15	451	
	65	BLK			450	
	66	WHT	24	15	449	
	67	BLK			448	
	68	WHT	24	15	447	
	69	BLK			446	
	70	WHT	24	15	445	
	71	BLK			444	
	72	WHT	24	15	443	
	73	BLK			442	
	74	WHT	24	15	441	
	75	BLK			440	
	76	WHT	24	15	439	
	77	BLK			438	
	78	WHT	24	15	437	
	79	BLK			436	
	80	WHT	24	15	435	
	81	BLK			434	
	82	WHT	24	15	433	
	83	BLK			432	
	84	WHT	24	15	431	
	85	BLK			430	
	86	WHT	24	15	429	
	87	BLK			428	
	88	WHT	24	15	427	
	89	BLK			426	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
**1	90	WHT	24	15	425	
**2	91	BLK			424	
*	45	SHIELD			470	*
	93	WHT	24	15	422	GROUP IV ATTACH FIND NO. 20 AND 22 LG 354.00 ± 2.00 SEE NOTE 7
	94	BLK			421	
	95	WHT	24	15	420	
	96	BLK			419	
	97	WHT	24	15	418	
	98	BLK			417	
	99	WHT	24	15	416	
	100	BLK			415	
	101	WHT	24	15	414	
	102	BLK			413	
	103	WHT	24	15	412	
	104	BLK			411	
	105	WHT	24	15	410	
	106	BLK			409	
	107	WHT	24	15	408	
	108	BLK			407	
	109	WHT	24	15	406	
	110	BLK			405	
	111	WHT	24	15	404	
	112	BLK			403	
	113	WHT	24	15	402	
	114	BLK			401	
	115	WHT	24	15	400	
	116	BLK			399	
	117	WHT	24	15	398	
	118	BLK			397	
	119	WHT	24	15	396	
	120	BLK			395	
	121	WHT	24	15	394	
	122	BLK			393	
	123	WHT	24	15	392	
	124	BLK			391	
	125	WHT	24	15	390	
	126	BLK			389	
	127	WHT	24	15	388	
	128	BLK			387	
	129	WHT	24	15	386	
	130	BLK			385	
	131	WHT	24	15	384	
	132	BLK			383	
	133	WHT	24	15	382	
	134	BLK			381	
	135	WHT	24	15	380	
	136	BLK			379	
*	92	SHIELD			423	*
	138	WHT	24	16	314	GROUP III ATTACH FIND NO. 19 AND 22 LG 75.00 ± 1.00 SEE NOTE 7
	139	WHT	24	16	313	
	140	WHT	24	16	312	
	141	WHT	24	16	311	
	142	WHT	24	15	310	
	143	BLK			291	
	144	WHT	24	15	309	
	145	BLK			292	
	146	WHT	24	15	308	
	147	BLK			293	
	148	WHT	24	15	307	
	149	BLK			294	
	150	WHT	24	15	306	
	151	BLK			295	
	152	WHT	24	15	305	
	153	BLK			296	
	154	WHT	24	15	304	
	155	BLK			297	
	156	WHT	24	15	303	
	157	BLK			298	
	158	WHT	24	15	302	
	159	BLK			299	
	160	WHT	24	15	301	
	161	BLK			300	
*	137	SHIELD			315	*
	163	WHT	24	16	233	GROUP II ATTACH FIND NO. 20 AND 22 LG 75.00 ± 1.00 SEE NOTE 7
	164	WHT	24	16	234	
	165	WHT	24	16	235	
	166	WHT	24	16	236	
	167	WHT	24	15	237	
	168	BLK			290	
	169	WHT	24	15	238	
	170	BLK			289	
	171	WHT	24	15	239	
	172	BLK			288	
	173	WHT	24	15	240	
	174	BLK			287	
	175	WHT	24	15	241	
	176	BLK			286	
	177	WHT	24	15	242	
	178	BLK			285	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	179	WHT	24	15	243	
	180	BLK			284	
	181	WHT	24	15	244	
	182	BLK			283	
	183	WHT	24	15	245	
	184	BLK			282	
	185	WHT	24	15	246	
	186	BLK			281	
	187	WHT	24	15	247	
	188	BLK			280	
	189	WHT	24	15	248	
	190	BLK			279	
	191	WHT	24	15	249	
	192	BLK			278	
	193	WHT	24	15	250	
	194	BLK			277	
	195	WHT	24	15	251	
	196	BLK			276	
	197	WHT	24	15	252	
	198	BLK			275	
	199	WHT	24	15	253	
	200	BLK			274	
	201	WHT	24	15	254	
	202	BLK			273	
	203	WHT	24	15	255	
	204	BLK			272	
	205	WHT	24	15	256	
	206	BLK			271	
	207	WHT	24	15	257	
	208	BLK			270	
	209	WHT	24	15	258	
	210	BLK			269	
	211	WHT	24	15	259	
	212	BLK			268	
	213	WHT	24	15	260	
	214	BLK			267	
	215	WHT	24	15	261	
	216	BLK			266	
	217	WHT	24	15	262	
	218	BLK			265	
	219	WHT	24	15	263	
	220	BLK			264	
*	162	SHIELD			232	*
	222	WHT	24	16	227	GROUP I ATTACH FIND NO. 18 AND 42 LG 75.00 ± 1.00 SEE NOTE 7
	223				228	
	224				229	
	225				230	
	226	WHT	24	16	231	
*	221	SHIELD				
	316	WHT	24	15	377	GROUP VII ATTACH FIND NO. 19 AND 23 LG 300.00 ± 2.00 SEE NOTE 7
	317	BLK			376	
	318	WHT	24	16	375	
	319				374	
	320				373	
	321				372	
	322				371	
	323				370	
	324				369	
	325				368	
	326				367	
	327				366	
	328				365	
	329				364	
	330				363	
	331				362	
	332				361	
	333				360	
	334				359	
	335				358	
	336				357	
	337				356	
	338				355	
	339				354	
	340				353	
	341				352	
	342				351	
	343				350	
	344				349	
	345				348	
	346	WHT	24	16	347	
		SHIELD			378	*

* ATTACH FIND NO. 17 LG 6.00 ± .25

** DENOTES: CRIMP WITH RUN NO. SHOWN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 317 DATE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE 26 DEC 68
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W50
SPACECRAFT TEST CABLE
CTS TO AGC

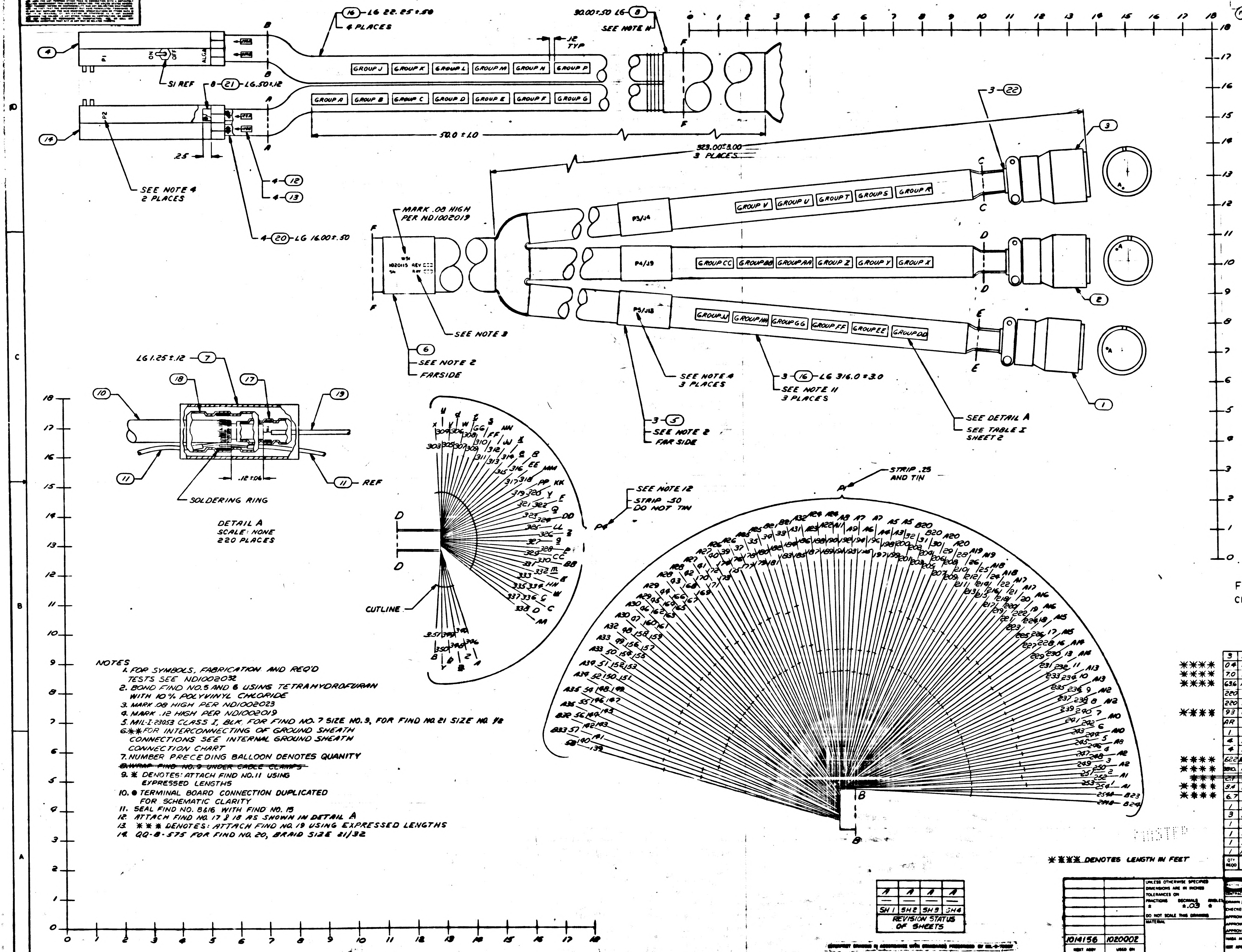
CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020114
SCALE NONE WT SHEET 5 OF 5

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020114

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 09777 DR. W. Dunn CHK. Q.G.C APPD.	7-1-64	TB


P1
P2
ON
OFF
ALGA
S1 REF
4 PLACES
L6 22.25 ± .50
L6 .50 ± .12
12 TYP
30.00 ± .50 L6
SEE NOTE 14
50.0 ± 1.0
.25
SEE NOTE 4
2 PLACES
L6 16.00 ± .50
GROUP J
GROUP K
GROUP L
GROUP M
GROUP N
GROUP P
GROUP A
GROUP B
GROUP C
GROUP D
GROUP E
GROUP F
GROUP G
323.00 ± 3.00
3 PLACES
MARK .08 HIGH
PER ND1002019
W51
1020115
REV
SN
RAV
SEE NOTE 3
SEE NOTE 2
FARSIDE
P3/J4
P4/J9
P5/J13
GROUP V
GROUP U
GROUP T
GROUP S
GROUP R
GROUP CC
GROUP BB
GROUP AA
GROUP Z
GROUP Y
GROUP X
GROUP JJ
GROUP HH
GROUP GG
GROUP FF
GROUP EE
GROUP DD
SEE NOTE 4
3 PLACES
L6 316.0 ± 3.0
SEE NOTE 11
3 PLACES
SEE NOTE 2
FAR SIDE
SEE DETAIL A
SEE TABLE I
SHEET 2
L6 1.25 ± .12
.12 ± .06
SOLDERING RING
REF
DETAIL A
SCALE: NONE
220 PLACES
CUTLINE
SEE NOTE 12
STRIP .50
DO NOT TIN
STRIP .25
AND TIN
P1
P4

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. BOND FIND NO. 5 AND 6 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
3. MARK .08 HIGH PER ND1002023
4. MARK .12 HIGH PER ND1002019
5. MIL-I-23053 CLASS I, BLK. FOR FIND NO. 7 SIZE NO. 9, FOR FIND NO. 21 SIZE NO. 12
6. ✱✱ FOR INTERCONNECTING OF GROUND SHEATH CONNECTIONS SEE INTERNAL GROUND SHEATH CONNECTION CHART
7. NUMBER PRECEDING BALLOON DENOTES QUANITY
~~8. WRAP FIND NO. 9 UNDER CABLE CLAMPS~~
9. ✱ DENOTES: ATTACH FIND NO. 11 USING EXPRESSED LENGTHS
10. ● TERMINAL BOARD CONNECTION DUPLICATED FOR SCHEMATIC CLARITY
11. SEAL FIND NO. 8 & 16 WITH FIND NO. 15
12. ATTACH FIND NO. 17 & 18 AS SHOWN IN DETAIL A
13. ✱✱✱ DENOTES: ATTACH FIND NO. 19 USING EXPRESSED LENGTHS
14. QQ-B-575 FOR FIND NO. 20, BRAID SIZE 21/32

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	3	AN 3420-12	BUSHING	22
✱✱✱✱	0.4	SEE NOTE 5	SLEEVING	21
✱✱✱✱	7.0	SEE NOTE 14	WIRE, BRAID	20
✱✱✱✱	63.6	MIL-W-16878/4 E22 WHT	WIRE, ELECT	19
	220	1010402-2	SLEEVE, SOLDER	18
	220	1010402-1	SLEEVE, SOLDER	17
✱✱✱✱	93	1006696-8	TUBING, ZIPPER	16
	AR		CEMENT	15
	1	1020121	CONNECTOR,	14
	4	1000292-33	FERRULE, ELEC CONDUCTOR	13
	4	1000293-36	FERRULE, ELEC CONDUCTOR	12
✱✱✱✱	622	MIL-W-16878/4 E22, BLK	WIRE, ELEC	11
✱✱✱✱	3810	RG-180 B/U	WIRE, COAX	10
~~✱✱✱✱~~	~~2.7~~	~~1006692-3~~	~~TAPE, PRESSURE SENSITIVE ADHESIVE~~	~~9~~
✱✱✱✱	9.4	1006696-10	TUBING, ZIPPER	8
✱✱✱✱	6.7	SEE NOTE 5	SLEEVING	7
	1	1019472-11	BAND MARKER, CABLE	6
	3	1019472-5A	BAND MARKER, CABLE	5
	1	1020120	CONNECTOR	4
	1	MS3126F-24-61PX	CONNECTOR	3
	1	MS3126F-24-61PZ	CONNECTOR	2
	1	MS3126F-24-61PY	CONNECTOR	1

LIST OF MATERIALS

✱✱✱✱ DENOTES LENGTH IN FEET

A	A	A	A
—	—	—	—
SH 1	SH 2	SH 3	SH 4

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. Glass DATE 22 Dec
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SIT APPROVAL
SIT APPROVAL 1-14-64

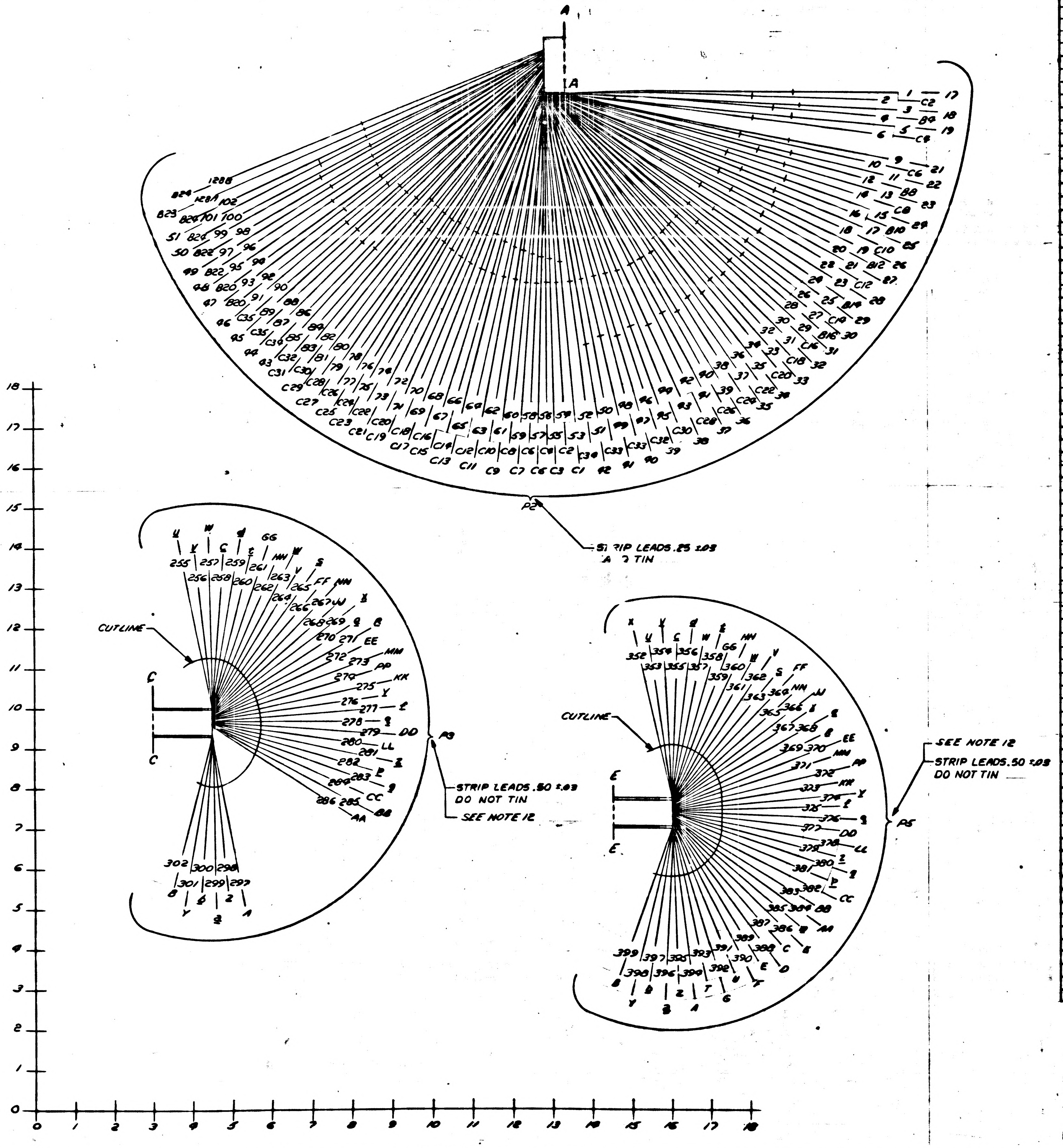
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020115
SCALE 1/1
WT
SHEET 1 OF 4

[illegible]

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
	~~CL B RELEASED PER TDRR~~ 0637		
A	CHANGED PER TDRR 09777 DR. W. Dunn CHK. O.G. C APP		TD


A
A
P2
STRIP LEADS .25 ±.03 AND TIN
CUTLINE
C
C
P3
STRIP LEADS .50 ±.03 DO NOT TIN
SEE NOTE 12
CUTLINE
E
E
P5
SEE NOTE 12
STRIP LEADS .50 ±.03 DO NOT TIN

INTERNAL GRD SHEATH CONNECTION			
FROM	TO	LENGTH	FIND NO.
255	256	4.00	11
256	257		
257	258		
258	259		
259	260		
260	261		
262	263		
263	264		
264	265		
265	266		
266	267		
267	268		
269	270		
270	271		
271	272		
272	273		
273	274		
274	275		
276	277		
277	278		
278	279		
279	280		
280	281		
281	282		
283	284		
284	285		
285	286		
303	304		
304	305		
305	306		
306	307		
307	308		
308	309		
310	311		
311	312		
312	313		
313	314		
314	315		
315	316		
317	318		
318	319		
319	320		
320	321		
321	322		
322	323		
324	325		
325	326		
326	327		
327	328		
328	329		
329	330		
338	331		
331	332		
332	333		
333	334		
334	335		
335	336		
336	337		
352	353		
353	354		
354	355		
355	356		
356	357		
357	358		
359	360	4.00	11

INTERNAL GRD SHEATH CONNECTION			
FROM	TO	LENGTH	FIND NO.
360	361	4.00	11
361	362		
362	363		
363	364		
364	365		
366	367		
367	368		
368	369		
369	370		
370	371		
371	372		
373	374		
374	375		
375	376		
376	377		
377	378		
378	379		
380	381		
381	382		
382	383		
383	384		
384	385		
385	386		
387	388		
388	389		
389	390		
390	391		
391	392		
392	393	4.00	11

TABLE I	
GROUP NO.	RUN NO.
A	1,3,5
B	9,11,13,15,17,19,21,23,25,27
C	29,31,33,35,37,39,41,43,45,47
D	49,51,53,55,57,59,61,63,65,67
E	69,71,73,75,77,79,81,83,85,87
F	89,91,93,95,97,99,101
G	121,123
H	
J	139,141,143,145,147,149,151,153
K	155,157,159,161,163,165,167,169,171,173
L	175,177,179,181,183,185,187,189,191,193
M	195,197,199,201,203,205,207,209,211,213
N	215,217,219,221,223,225,227,229,231,233
P	235,237,239,241,243,245,247,249,251,253
R	255,256,257,258,259,260,261
S	262,263,264,265,266,267,268
T	269,270,271,272,273,274,275
U	276,277,278,279,280,281,282
V	283,284,285,286
W	
X	303,304,305,306,307,308,309
Y	310,311,312,313,314,315,316
Z	317,318,319,320,321,322,323
AA	324,325,326,327,328,329,330
BB	331,332,333,334,335,336,337
CC	338
DD	352,353,354,355,356,357,358
EE	359,360,361,362,363,364,365
FF	366,367,368,369,370,371,372
GG	373,374,375,376,377,378,379
HH	380,381,382,383,384,385,386
JJ	387,388,389,390,391,392,393

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.25 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. D. Glass DATE 31 DEC 63
CHECKED A. Caggiano 13 Jan 64
APPROVAL J. P. K
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020115
SCALE 1/1 WT
SHEET 2 OF 4

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 09777 DR. CHK. G.C. APP	7-1-64	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
***LG 8.50	1	COAX		10	383	***LG 8.50
*LG 9.00	2	SHIELD				**
***LG 8.50	3	COAX		10	384	***LG 8.50
*LG 9.00	4	SHIELD				**
***LG 8.50	5	COAX		10	309	***LG 3.50
*LG 9.00	6	SHIELD			346	** *LG 4.75
***LG 9.75	9	COAX		10	385	***LG 8.50
*LG 10.25	10	SHIELD				**
***LG 9.75	11	COAX		10	386	***LG 8.50
*LG 10.25	12	SHIELD			398	** *LG 9.75
***LG 9.75	13	COAX		10	306	***LG 3.50
*LG 10.25	14	SHIELD				**
***LG 9.75	15	COAX		10	389	***LG 9.75
*LG 10.25	16	SHIELD				**
***LG 9.75	17	COAX		10	390	***LG 9.75
*LG 10.25	18	SHIELD				**
***LG 9.75	19	COAX		10	391	***LG 9.75
*LG 10.25	20	SHIELD				**
***LG 9.75	21	COAX		10	310	***LG 4.75
*LG 10.25	22	SHIELD				**
***LG 9.75	23	COAX		10	311	***LG 4.75
*LG 10.25	24	SHIELD				**
***LG 9.75	25	COAX		10	312	***LG 4.75
*LG 10.25	26	SHIELD				**
***LG 9.75	27	COAX		10	392	***LG 9.75
*LG 10.25	28	SHIELD				**
***LG 11.00	29	COAX		10	367	***LG 6.00
*LG 11.50	30	SHIELD				**
***LG 11.00	31	COAX		10	368	***LG 6.00
*LG 11.50	32	SHIELD				**
***LG 11.00	33	COAX		10	369	***LG 6.00
*LG 11.50	34	SHIELD				**
***LG 11.00	35	COAX		10	370	***LG 6.00
*LG 11.50	36	SHIELD				**
***LG 11.00	37	COAX		10	371	***LG 6.00
*LG 11.50	38	SHIELD				**
***LG 11.00	39	COAX		10	372	***LG 6.00
*LG 11.50	40	SHIELD			396	** *LG 7.25
***LG 11.00	41	COAX		10	373	***LG 7.25
*LG 11.50	42	SHIELD				**
***LG 11.00	43	COAX		10	374	***LG 7.25
*LG 11.50	44	SHIELD				**
***LG 11.00	45	COAX		10	375	***LG 7.25
*LG 11.50	46	SHIELD				**
***LG 11.00	47	COAX		10	376	***LG 7.25
*LG 11.50	48	SHIELD				**
***LG 12.25	49	COAX		10	377	***LG 7.25
*LG 12.75	50	SHIELD				**
***LG 12.25	51	COAX		10	378	***LG 7.25
*LG 12.75	52	SHIELD				**
***LG 12.25	53	COAX		10	265	***LG 4.75
*LG 12.75	54	SHIELD				**
***LG 12.25	55	COAX		10	264	***LG 4.75
*LG 12.75	56	SHIELD				**
***LG 12.25	57	COAX		10	266	***LG 4.75
*LG 12.75	58	SHIELD				**
***LG 12.25	59	COAX		10	267	***LG 4.75
*LG 12.75	60	SHIELD				**
***LG 12.25	61	COAX		10	268	***LG 4.75
*LG 12.75	62	SHIELD			298	** *LG 6.00
***LG 12.25	63	COAX		10	269	***LG 6.00
*LG 12.75	64	SHIELD				**
***LG 12.25	65	COAX		10	270	***LG 6.00
*LG 12.75	66	SHIELD				**
***LG 12.25	67	COAX		10	271	***LG 6.00
*LG 12.75	68	SHIELD				**
***LG 13.50	69	COAX		10	272	***LG 6.00
*LG 14.00	70	SHIELD				**
***LG 13.50	71	COAX		10	273	***LG 6.00
*LG 14.00	72	SHIELD				**
***LG 13.50	73	COAX		10	274	***LG 6.00
*LG 14.00	74	SHIELD				**
***LG 13.50	75	COAX		10	275	***LG 6.00
*LG 14.00	76	SHIELD			299	** *LG 7.25
***LG 13.50	77	COAX		10	276	***LG 7.25
*LG 14.00	78	SHIELD				**
***LG 13.50	79	COAX		10	277	***LG 7.25
*LG 14.00	80	SHIELD				**

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
***LG 13.50	81	COAX		10	388	***LG 9.75
*LG 14.00	82	SHIELD				**
***LG 13.50	83	COAX		10	278	***LG 7.25
*LG 14.00	84	SHIELD				**
***LG 13.50	85	COAX		10	379	***LG 7.25
*LG 14.00	86	SHIELD			397	** *LG 8.50
***LG 13.50	87	COAX		10	380	***LG 8.50
*LG 14.00	88	SHIELD				**
***LG 14.75	89	COAX		10	381	***LG 8.50
*LG 15.25	90	SHIELD				**
***LG 14.75	91	COAX		10	382	***LG 8.50
*LG 15.25	92	SHIELD				**
***LG 14.75	93	COAX		10	257	***LG 3.50
*LG 15.25	94	SHIELD				**
***LG 14.75	95	COAX		10	307	***LG 3.50
*LG 15.25	96	SHIELD				**
***LG 14.75	97	COAX		10	305	***LG 3.50
*LG 15.25	98	SHIELD				**
***LG 14.75	99	COAX		10	303	***LG 3.50
*LG 15.25	100	SHIELD				**
***LG 14.75	101	COAX		10	393	***LG 9.75
*LG 15.25	102	SHIELD			399	** *LG 11.00
***LG 16.00	121	COAX		10	263	***LG 4.75
*LG 16.50	122	SHIELD				**
***LG 16.00	123	COAX		10	262	***LG 1.25
*LG 16.50	124	SHIELD				**
***LG 9.75	139	COAX		10	387	***LG 9.75
*LG 10.25	140	SHIELD				**
***LG 9.75	141	COAX		10	338	***LG 9.75
*LG 10.25	142	SHIELD			351	** *LG 11.00
***LG 9.75	143	COAX		10	304	***LG 3.50
*LG 10.25	144	SHIELD				**
***LG 9.75	145	COAX		10	308	***LG 3.50
*LG 10.25	146	SHIELD				**
***LG 9.75	147	COAX		10	331	***LG 8.50
*LG 10.25	148	SHIELD				**
***LG 9.75	149	COAX		10	329	***LG 7.25
*LG 10.25	150	SHIELD				**
***LG 9.75	151	COAX		10	337	***LG 8.50
*LG 10.25	152	SHIELD			350	** *LG 9.75
***LG 9.75	153	COAX		10	366	***LG 6.00
*LG 10.25	154	SHIELD				**
***LG 11.00	155	COAX		10	365	***LG 4.75
*LG 11.50	156	SHIELD			395	** *LG 6.00
***LG 11.00	157	COAX		10	364	***LG 4.75
*LG 11.50	158	SHIELD				**
***LG 11.00	159	COAX		10	363	***LG 4.75
*LG 11.50	160	SHIELD				**
***LG 11.00	161	COAX		10	362	***LG 4.75
*LG 11.50	162	SHIELD				**
***LG 11.00	163	COAX		10	361	***LG 4.75
*LG 11.50	164	SHIELD				**
***LG 11.00	165	COAX		10	360	***LG 4.75
*LG 11.50	166	SHIELD				**
***LG 11.00	167	COAX		10	359	***LG 4.75
*LG 11.50	168	SHIELD				**
*LG 5.00	128A	SHIELD		20		
*LG 5.00	128B	SHIELD		20		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
***LG 11.00	169	COAX		10	358	***LG 3.50
*LG 11.50	170	SHIELD			394	** *LG 4.75
***LG 11.00	171	COAX		10	357	***LG 3.50
*LG 11.50	172	SHIELD				**
***LG 11.00	173	COAX		10	356	***LG 3.50
*LG 11.50	174	SHIELD				**
***LG 12.25	175	COAX		10	355	***LG 3.50
*LG 12.75	176	SHIELD				**
***LG 12.25	177	COAX		10	256	***LG 3.50
*LG 12.75	178	SHIELD				**
***LG 12.25	179	COAX		10	325	***LG 7.25
*LG 12.75	180	SHIELD				**
***LG 12.25	181	COAX		10	324	***LG 7.25
*LG 12.75	182	SHIELD				**
***LG 12.25	183	COAX		10	323	***LG 6.00
*LG 12.75	184	SHIELD			348	** *LG 7.25
***LG 12.25	185	COAX		10	284	***LG 8.50
*LG 12.75	186	SHIELD				**
***LG 12.25	187	COAX		10	283	***LG 8.50
*LG 12.75	188	SHIELD			302	** *LG 9.75
***LG 12.25	189	COAX		10	282	***LG 7.25
*LG 12.75	190	SHIELD			300	** *LG 8.50
***LG 12.25	191	COAX		10	281	***LG 7.25
*LG 12.75	192	SHIELD				**
***LG 12.25	193	COAX		10	280	***LG 7.25
*LG 12.75	194	SHIELD				**
***LG 13.50	195	COAX		10	285	***LG 8.50
*LG 14.00	196	SHIELD				**
***LG 13.50	197	COAX		10	286	***LG 8.50
*LG 14.00	198	SHIELD			301	** *LG 9.75
***LG 13.50	199	COAX		10	279	***LG 7.25
*LG 14.00	200	SHIELD				**
***LG 13.50	201	COAX		10	322	***LG 6.00
*LG 14.00	202	SHIELD				**
***LG 13.50	203	COAX		10	321	***LG 6.00
*LG 14.00	204	SHIELD				**
***LG 13.50	205	COAX		10	320	***LG 6.00
*LG 14.00	206	SHIELD				**
***LG 13.50	207	COAX		10	319	***LG 6.00
*LG 14.00	208	SHIELD				**
***LG 13.50	209	COAX		10	318	***LG 6.00
*LG 14.00	210	SHIELD				**
***LG 13.50	211	COAX		10	336	***LG 8.50
*LG 14.00	212	SHIELD				**
***LG 13.50	213	COAX		10	330	***LG 7.25
*LG 14.00	214	SHIELD			399	** *LG 8.50
***LG 14.75	215	COAX		10	335	***LG 8.50
*LG 15.25	216	SHIELD				**
***LG 14.75	217	COAX		10	334	***LG 8.50
*LG 15.25	218	SHIELD				**
***LG 14.75	219	COAX		10	353	***LG 3.50
*LG 15.25	220	SHIELD				**
***LG 14.75	221	COAX		10	352	***LG 3.50
*LG 15.25	222	SHIELD				**
***LG 14.75	223	COAX		10	317	***LG 6.00
*LG 15.25	224	SHIELD				**
***LG 14.75	225	COAX		10	255	***LG 3.50
*LG 15.25	226	SHIELD				**
***LG 14.75	227	COAX		10	316	***LG 4.75
*LG 15.25	228	SHIELD			397	** *LG 6.00
***LG 14.75	229	COAX		10	313	***LG 4.75
*LG 15.25	230	SHIELD				**
***LG 14.75	231	COAX		10	315	***LG 4.75
*LG 15.25	232	SHIELD				**
***LG 14.75	233	COAX		10	314	***LG 4.75
*LG 15.25	234	SHIELD				**
***LG 16.00	235	COAX		10	260	***LG 3.50
*LG 16.50	236	SHIELD				**
***LG 16.00	237	COAX		10	259	***LG 3.50
*LG 16.50	238	SHIELD				**
***LG 16.00	239	COAX		10	326	***LG 7.25
*LG 16.50	240	SHIELD				**
***LG 16.00	241	COAX		10	258	***LG 3.50
*LG 16.50	242	SHIELD				**
***LG 16.00	243	COAX		10	332	***LG 8.50
*LG 16.50	244	SHIELD				**
***LG 16.00	245	COAX		10	333	***LG 8.50
*LG 16.50	246	SHIELD				**
***LG 16.00	247	COAX		10	328	***LG 7.25
*LG 16.50	248	SHIELD				**
***LG 16.00	249	COAX		10	327	***LG 7.25
*LG 16.50	250	SHIELD				**
***LG 16.00	251	COAX		10	354	***LG 3.50
*LG 16.50	252	SHIELD				**
***LG 16.00	253	COAX		10	261	***LG 3.50
*LG 16.50	254	SHIELD			297	** *LG 4.75
*LG 5.00	254A	SHIELD		20		
*LG 5.00	254B	SHIELD		20		

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 7/1/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.25 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SNT APPROVAL
SNT APPROVAL

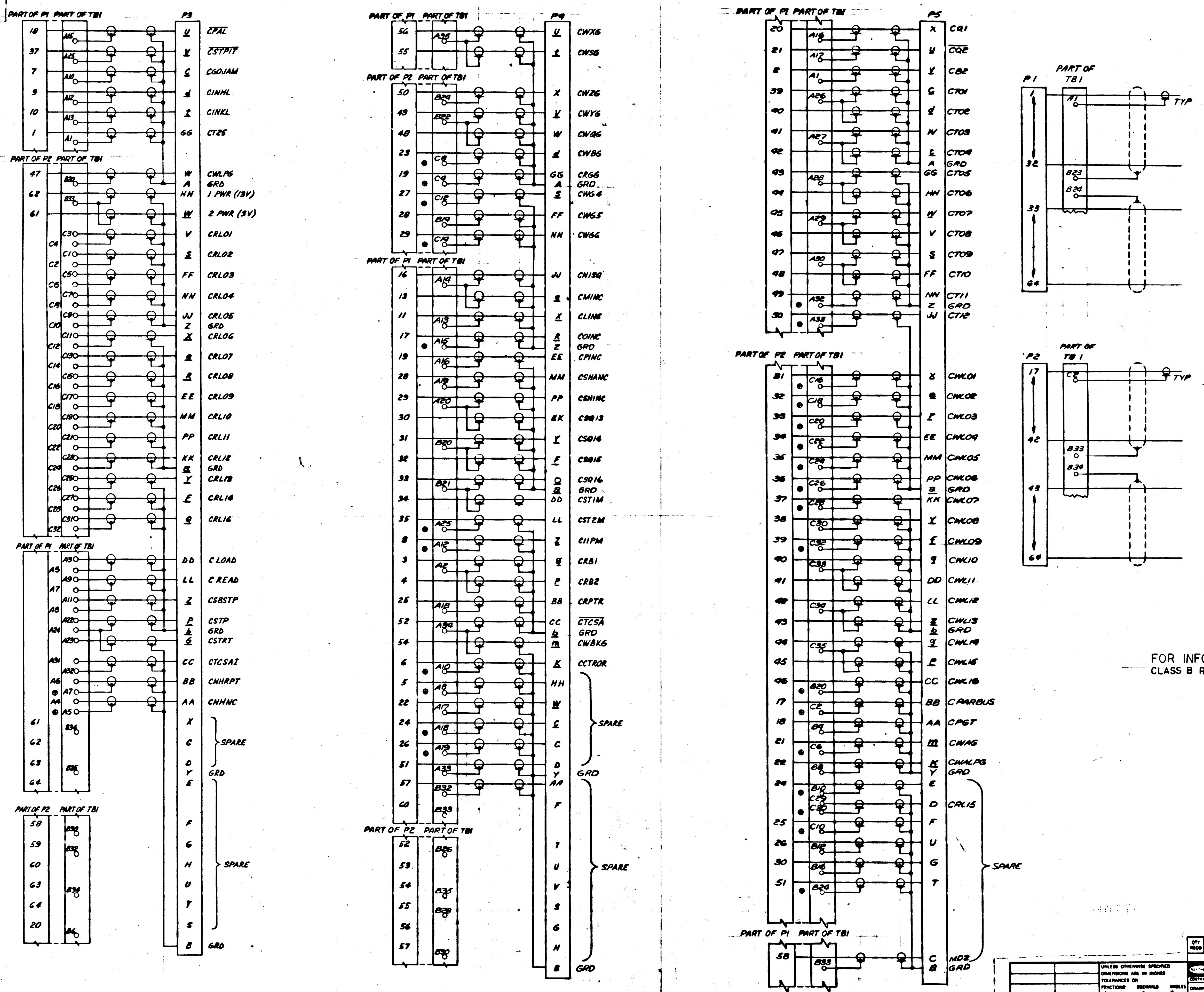
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020115
SCALE NONE
WT
SHEET 3 OF 4

1020115

SYM	DESCRIPTION	DATE	APPROVED
—	~~CL B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 09777 DR. W. Dawn CHK G.G.C APPD	7-1-64	



PART OF P1
PART OF TB1
PART OF P2
P3
P4
P5
CPAL
CSTPIT
CGOJAM
CINHL
CINKL
CT25
CWLP6
GRD
1 PWR (13V)
2 PWR (3V)
CRL01
CRL02
CRL03
CRL04
CRL05
CRL06
CRL07
CRL08
CRL09
CRL10
CRL11
CRL12
CRL13
CRL14
CRL16
C LOAD
C READ
CSBSTP
CSTP
CSTRT
CTCSAI
CNHRPT
CNHNC
SPARE
CWX6
CWS6
CWZ6
CWY6
CWQ6
CWB6
CRG6
CWG4
CWG5
CWG6
CN1SQ
CMINC
CLINC
COINC
CPINC
CSHANC
CSHINC
CSQ13
CSQ14
CSQ15
CSQ16
CSTIM
CST2M
C11PM
CRB1
CRB2
CRPTR
CTCSA
CWBK6
CCTROR
CQ1
CQ2
CB2
CT01
CT02
CT03
CT04
CT05
CT06
CT07
CT08
CT09
CT10
CT11
CT12
CWL01
CWL02
CWL03
CWL04
CWL05
CWL06
CWL07
CWL08
CWL09
CWL10
CWL11
CWL12
CWL13
CWL14
CWL15
CWL16
CPARBUS
CPGT
CWAG
CWALPG
CRL15
MD2
P1
P2
TYP

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/1/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

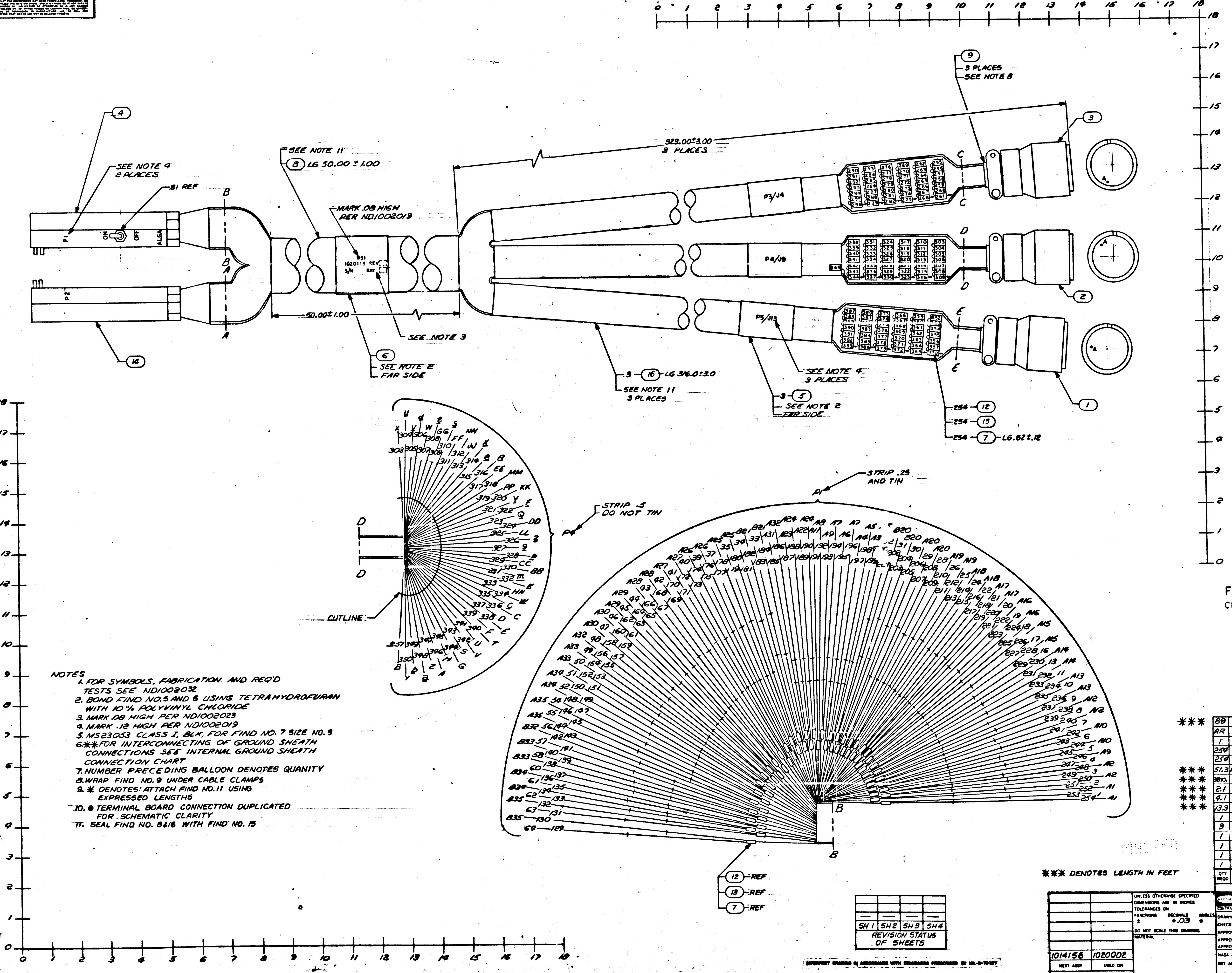
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Sorg
CHECKED A. Caggiano
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020115
SCALE NONE
WT
SHEET 4 OF 4

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR		


SEE NOTE 9
2 PLACES
S1 REF
P1
ON
OFF
P2
B
A
SEE NOTE 11
LG 50.00 ± 1.00
MARK .08 HIGH
PER ND1002019
W51
1020115
S/N
REV
323.00±3.00
3 PLACES
3 PLACES
SEE NOTE 8
C
D
E
P3/J4
P4/J9
P5/J13
50.00±1.00
SEE NOTE 3
SEE NOTE 2
FAR SIDE
3 - 16 - LG 316.0±3.0
SEE NOTE 11
3 PLACES
3 - 5
SEE NOTE 2
FAR SIDE
SEE NOTE 4
3 PLACES
254 - 12
254 - 13
254 - 7 - LG .62±.12
STRIP .5
DO NOT TIN
P4
CUTLINE
STRIP .25
AND TIN
P1
12 - REF
13 - REF
7 - REF

NOTES
1. FOR SYMBOLS, FABRICATION AND REQ'D TESTS SEE ND1002032
2. BOND FIND NO.5 AND 6 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
3. MARK .08 HIGH PER ND1002023
4. MARK .12 HIGH PER ND1002019
5. MS23053 CLASS I, BLK, FOR FIND NO. 7 SIZE NO. 5
6. ✱✱ FOR INTERCONNECTING OF GROUND SHEATH CONNECTIONS SEE INTERNAL GROUND SHEATH CONNECTION CHART
7. NUMBER PRECEDING BALLOON DENOTES QUANITY
8. WRAP FIND NO. 9 UNDER CABLE CLAMPS
9. ✱ DENOTES: ATTACH FIND NO.11 USING EXPRESSED LENGTHS
10. ● TERMINAL BOARD CONNECTION DUPLICATED FOR SCHEMATIC CLARITY
11. SEAL FIND NO. 8&16 WITH FIND NO. 15

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
✱✱✱	89	1006696-8	TUBING, ZIPPER	16
	AR		CEMENT	15
	1	1020121	CONNECTOR,	14
	254	1000242-15	FERRULE, ELEC CONDUCTOR	13
	254	1000243-10	FERRULE, ELEC CONDUCTOR	12
✱✱✱	51.3	MIL-W-16878/4E22, BLK	WIRE, ELEC	11
✱✱✱	3810.	RG-180 B/U	WIRE, COAX	10
✱✱✱	2.1	1006692-3	TAPE, PRESSURE SENSITIVE ADHESIVE	9
✱✱✱	4.1	1006696-10	TUBING, ZIPPER	8
✱✱✱	13.3	SEE NOTE 5	SLEEVING	7
	1	1019472-11	BAND MARKER, CABLE	6
	3	1019472-5A	BAND MARKER, CABLE	5
	1	1020120	CONNECTOR	4
	1	MS3126F-24-61PX	CONNECTOR	3
	1	MS3126F-24-61PZ	CONNECTOR	2
	1	MS3126F-24-61PY	CONNECTOR	1

LIST OF MATERIALS

✱✱✱ DENOTES LENGTH IN FEET

SH 1	SH 2	SH 3	SH 4
—	—	—	—

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. Glass DATE 22 DEC
CHECKED 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 1-11-64

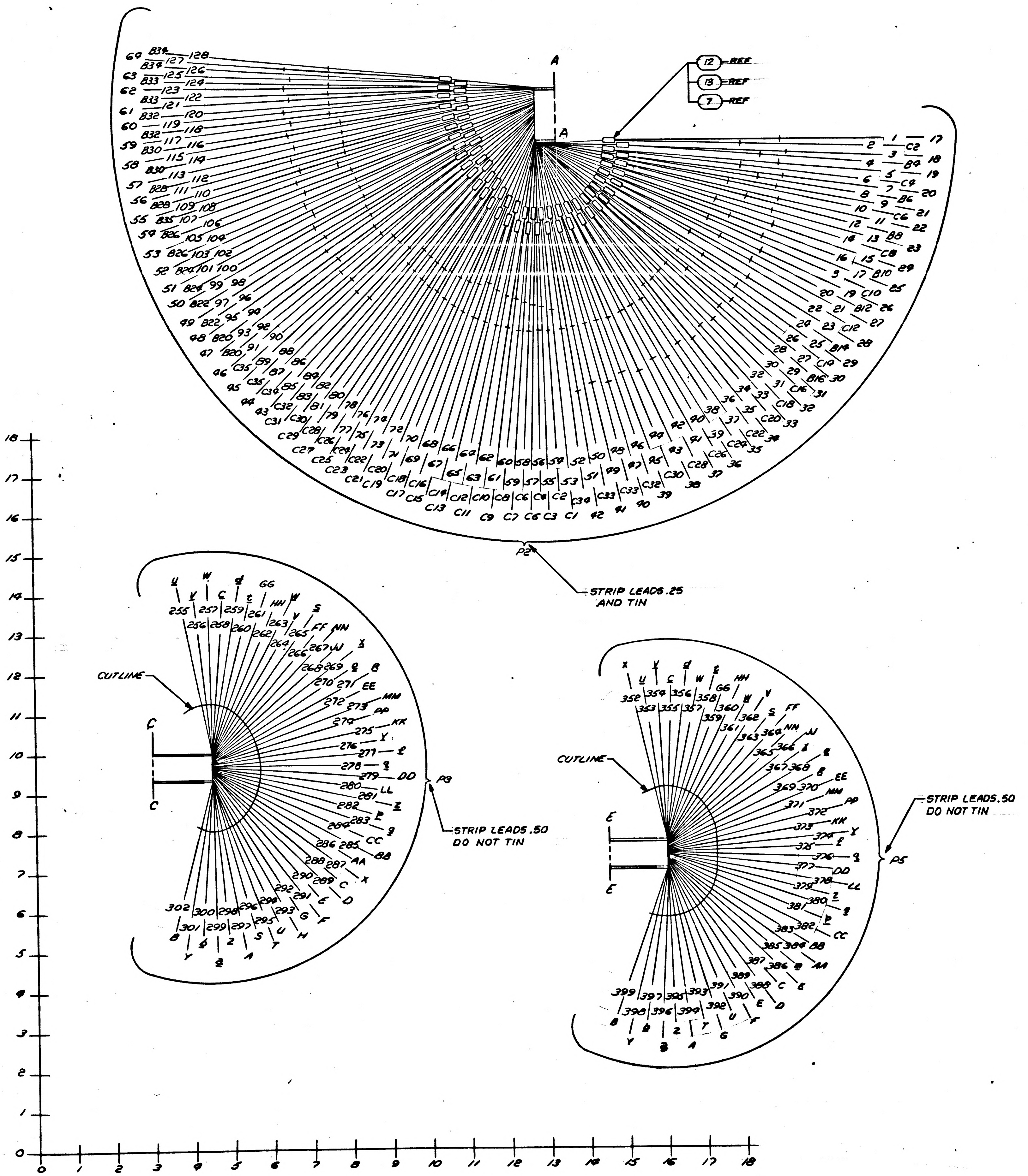
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020115
SCALE 1/1
WT
SHEET 1 OF

1020115

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]



STRIP LEADS .25 AND TIN

STRIP LEADS .50 DO NOT TIN

STRIP LEADS .50 DO NOT TIN

INTERNAL GND SHEATH CONNECTION			
FROM	TO	LENGTH	FIND NO.
255	256	2	11
256	257		
257	258		
258	259		
259	260		
260	261		
262	263		
263	264		
264	265		
265	266		
266	267		
267	268		
269	270		
270	271		
271	272		
272	273		
273	274		
274	275		
276	277		
277	278		
278	279		
279	280		
280	281		
281	282		
283	284		
284	285		
285	286		
286	287		
287	288		
288	289		
290	291		
291	292		
292	293		
293	294		
294	295		
295	296		
303	304		
304	305		
305	306		
306	307		
307	308		
308	309		
310	311		
[illegible]	312		
[illegible]	313		
[illegible]	314		
[illegible]	315		
[illegible]	316		
[illegible]	318		
318	319		
319	320		
320	321		
321	322		
322	323		
324	325		
325	326		
326	327		
327	328		
328	329		
329	330		
331	332		
332	333		
333	334		
334	335		
335	336		
336	337		
338	339		
339	340		
340	341		
341	342		
342	343		
343	344		
344	345		
352	353		
353	354		
354	355		
355	356		
356	357		
357	358		
359	360	2	11

INTERNAL GND SHEATH CONNECTION			
FROM	TO	LENGTH	FIND NO.
360	361	2	11
361	362		
362	363		
363	364		
364	365		
366	367		
367	368		
368	369		
369	370		
370	371		
371	372		
373	374		
374	375		
375	376		
376	377		
377	378		
378	379		
380	381		
381	382		
382	383		
383	384		
384	385		
385	386		
387	388		
388	389		
389	390		
390	391		
391	392		
392	393	2	11

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R. D. Chas DATE 31 DEC 63
CHECKED A. Cappone 13 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY, ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020115
SCALE 1/1 WT
SHEET 2 OF 4

PHOTOGRAPHIC SCALE ONLY
INCHES

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]	[illegible]	[illegible]

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
*LG3.75	1	COAX		10	383	**
	2	SHIELD				
*LG4.00	3	COAX		10	384	**
	4	SHIELD				
*LG3.75	5	COAX		10	309	** *LG3.88
	6	SHIELD			396	
*LG4.00	7	COAX		10	296	** *LG6.62
	8	SHIELD			302	
*LG3.50	9	COAX		10	385	**
	10	SHIELD				
*LG3.75	11	COAX		10	386	** *LG6.12
	12	SHIELD			398	
*LG3.75	13	COAX		10	306	**
	14	SHIELD				
*LG3.50	15	COAX		10	389	**
	16	SHIELD				
*LG3.25	17	COAX		10	390	**
	18	SHIELD				
*LG3.50	19	COAX		10	391	**
	20	SHIELD				
*LG3.00	21	COAX		10	310	**
	22	SHIELD				
*LG3.38	23	COAX		10	311	**
	24	SHIELD				
*LG3.00	25	COAX		10	312	**
	26	SHIELD				
*LG3.25	27	COAX		10	392	**
	28	SHIELD				
*LG3.00	29	COAX		10	367	**
	30	SHIELD				
*LG2.75	31	COAX		10	368	**
	32	SHIELD				
*LG3.00	33	COAX		10	369	**
	34	SHIELD				
*LG2.75	35	COAX		10	370	**
	36	SHIELD				
*LG3.25	37	COAX		10	371	**
	38	SHIELD				
*LG3.00	39	COAX		10	372	** *LG5.00
	40	SHIELD			396	
*LG3.25	41	COAX		10	373	**
	42	SHIELD				
*LG3.00	43	COAX		10	374	**
	44	SHIELD				
*LG3.25	45	COAX		10	375	**
	46	SHIELD				
*LG3.00	47	COAX		10	376	**
	48	SHIELD				
*LG3.25	49	COAX		10	377	**
	50	SHIELD				
*LG3.00	51	COAX		10	378	**
	52	SHIELD				
*LG3.25	53	COAX		10	265	**
	54	SHIELD				
*LG3.00	55	COAX		10	264	**
	56	SHIELD				
*LG3.25	57	COAX		10	266	**
	58	SHIELD				
*LG3.00	59	COAX		10	267	**
	60	SHIELD				
*LG3.25	61	COAX		10	268	** *LG4.50
	62	SHIELD			298	
*LG3.00	63	COAX		10	269	**
	64	SHIELD				
*LG3.25	65	COAX		10	270	**
	66	SHIELD				
*LG3.00	67	COAX		10	271	**
	68	SHIELD				
*LG3.25	69	COAX		10	272	**
	70	SHIELD				
*LG3.00	71	COAX		10	273	**
	72	SHIELD				
*LG3.38	73	COAX		10	274	**
	74	SHIELD				
*LG3.00	75	COAX		10	275	** *LG5.00
	76	SHIELD			299	
*LG3.50	77	COAX		10	276	**
	78	SHIELD				
*LG3.12	79	COAX		10	277	**
	80	SHIELD				

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
*LG3.50	81	COAX		10	388	**
	82	SHIELD				
*LG3.12	83	COAX		10	278	**
	84	SHIELD				
*LG3.25	85	COAX		10	379	** *LG5.62
	86	SHIELD			397	
*LG3.00	87	COAX		10	380	**
	88	SHIELD				
*LG3.38	89	COAX		10	381	**
	90	SHIELD				
*LG3.25	91	COAX		10	382	**
	92	SHIELD				
*LG3.62	93	COAX		10	257	**
	94	SHIELD				
*LG3.25	95	COAX		10	307	**
	96	SHIELD				
*LG3.62	97	COAX		10	305	**
	98	SHIELD				
*LG3.25	99	COAX		10	303	**
	100	SHIELD				
*LG3.50	101	COAX		10	393	** *LG6.62
	102	SHIELD			399	
*LG3.25	103	COAX		10	340	**
	104	SHIELD				
*LG3.50	105	COAX		10	341	**
	106	SHIELD				
*LG3.50	107	COAX		10	342	**
	108	SHIELD				
*LG3.50	109	COAX		10	343	**
	110	SHIELD				
*LG3.25	111	COAX		10	344	**
	112	SHIELD				
*LG3.50	113	COAX		10	345	** *LG7.25
	114	SHIELD			351	
*LG3.25	115	COAX		10	291	**
	116	SHIELD				
*LG3.75	117	COAX		10	292	**
	118	SHIELD				
*LG3.50	119	COAX		10	293	**
	120	SHIELD				
*LG3.75	121	COAX		10	263	**
	122	SHIELD				
*LG3.50	123	COAX		10	262	**
	124	SHIELD				
*LG3.75	125	COAX		10	294	**
	126	SHIELD				
*LG3.50	127	COAX		10	295	**
	128	SHIELD				
*LG3.25	129	COAX		10	290	**
	130	SHIELD				
*LG3.50	131	COAX		10	289	** *LG6.12
	132	SHIELD			301	
*LG3.25	133	COAX		10	288	**
	134	SHIELD				
*LG3.50	135	COAX		10	287	**
	136	SHIELD				
*LG3.25	137	COAX		10	339	**
	138	SHIELD				
*LG3.50	139	COAX		10	387	**
	140	SHIELD				
*LG3.25	141	COAX		10	338	**
	142	SHIELD				
*LG3.00	143	COAX		10	304	**
	144	SHIELD				
*LG2.75	145	COAX		10	308	**
	146	SHIELD				
*LG3.00	147	COAX		10	331	**
	148	SHIELD				
*LG2.75	149	COAX		10	329	**
	150	SHIELD				
*LG3.00	151	COAX		10	337	** *LG6.12
	152	SHIELD			350	
*LG2.75	153	COAX		10	366	**
	154	SHIELD				
*LG2.50	155	COAX		10	365	** *LG9.50
	156	SHIELD			395	
*LG2.75	157	COAX		10	364	**
	158	SHIELD				
*LG3.00	159	COAX		10	363	**
	160	SHIELD				
*LG.2.75	161	COAX		10	362	**
	162	SHIELD				
*LG3.00	163	COAX		10	361	**
	164	SHIELD				
*LG2.75	165	COAX		10	360	**
	166	SHIELD				
*LG3.00	167	COAX		10	359	**
	168	SHIELD				

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
*LG2.75	169	COAX		10	358	** *LG3.88
	170	SHIELD			394	
*LG3.00	171	COAX		10	357	**
	172	SHIELD				
*LG2.75	173	COAX		10	356	**
	174	SHIELD				
*LG3.00	175	COAX		10	355	**
	176	SHIELD				
*LG2.75	177	COAX		10	256	**
	178	SHIELD				
*LG3.00	179	COAX		10	325	**
	180	SHIELD				
*LG3.25	181	COAX		10	324	**
	182	SHIELD				
*LG3.50	183	COAX		10	323	** *LG5.00
	184	SHIELD			348	
*LG3.00	185	COAX		10	284	**
	186	SHIELD				
*LG3.25	187	COAX		10	283	**
	188	SHIELD				
*LG3.00	189	COAX		10	282	** *LG5.62
	190	SHIELD			300	
*LG3.25	191	COAX		10	281	**
	192	SHIELD				
*LG3.00	193	COAX		10	280	**
	194	SHIELD				
*LG3.25	195	COAX		10	285	**
	196	SHIELD				
*LG3.00	197	COAX		10	286	**
	198	SHIELD				
*LG3.25	199	COAX		10	279	**
	200	SHIELD				
*LG3.25	201	COAX		10	322	**
	202	SHIELD				
*LG3.50	203	COAX		10	321	**
	204	SHIELD				
*LG2.75	205	COAX		10	320	**
	206	SHIELD				
*LG3.00	207	COAX		10	319	**
	208	SHIELD				
*LG2.75	209	COAX		10	318	**
	210	SHIELD				
*LG3.00	211	COAX		10	336	**
	212	SHIELD				
*LG2.75	213	COAX		10	330	** *LG5.62
	214	SHIELD			349	
*LG3.00	215	COAX		10	335	**
	216	SHIELD				
*L[illegible].75	217	COAX		10	334	**
	218	SHIELD				
*[illegible].00	219	COAX		10	353	**
	220	SHIELD				
*LG2.75	221	COAX		10	352	**
	222	SHIELD				
*LG3.00	223	COAX		10	317	**
	224	SHIELD				
*LG2.75	225	COAX		10	255	**
	226	SHIELD				
*LG3.00	227	COAX		10	316	** *LG9.50
	228	SHIELD			347	
*LG2.75	229	COAX		10	313	**
	230	SHIELD				
*LG3.00	231	COAX		10	315	**
	232	SHIELD				
*LG2.75	233	COAX		10	314	**
	234	SHIELD				
*LG3.00	235	COAX		10	260	**
	236	SHIELD				
*LG2.75	237	COAX		10	259	**
	238	SHIELD				
*LG2.50	239	COAX		10	326	**
	240	SHIELD				
*LG2.75	241	COAX		10	258	**
	242	SHIELD				
*LG3.00	243	COAX		10	332	**
	244	SHIELD				
*LG2.75	245	COAX		10	333	**
	246	SHIELD				
*LG3.00	247	COAX		10	328	**
	248	SHIELD				
*LG2.75	249	COAX		10	327	**
	250	SHIELD				
*LG3.00	251	COAX		10	354	**
	252	SHIELD				
*LG2.75	253	COAX		10	261	**
	254	SHIELD			297	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.25 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 13 Jan 64
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible] 2-11-64
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY ELECTRICAL
W51
COMPUTER TEST SET

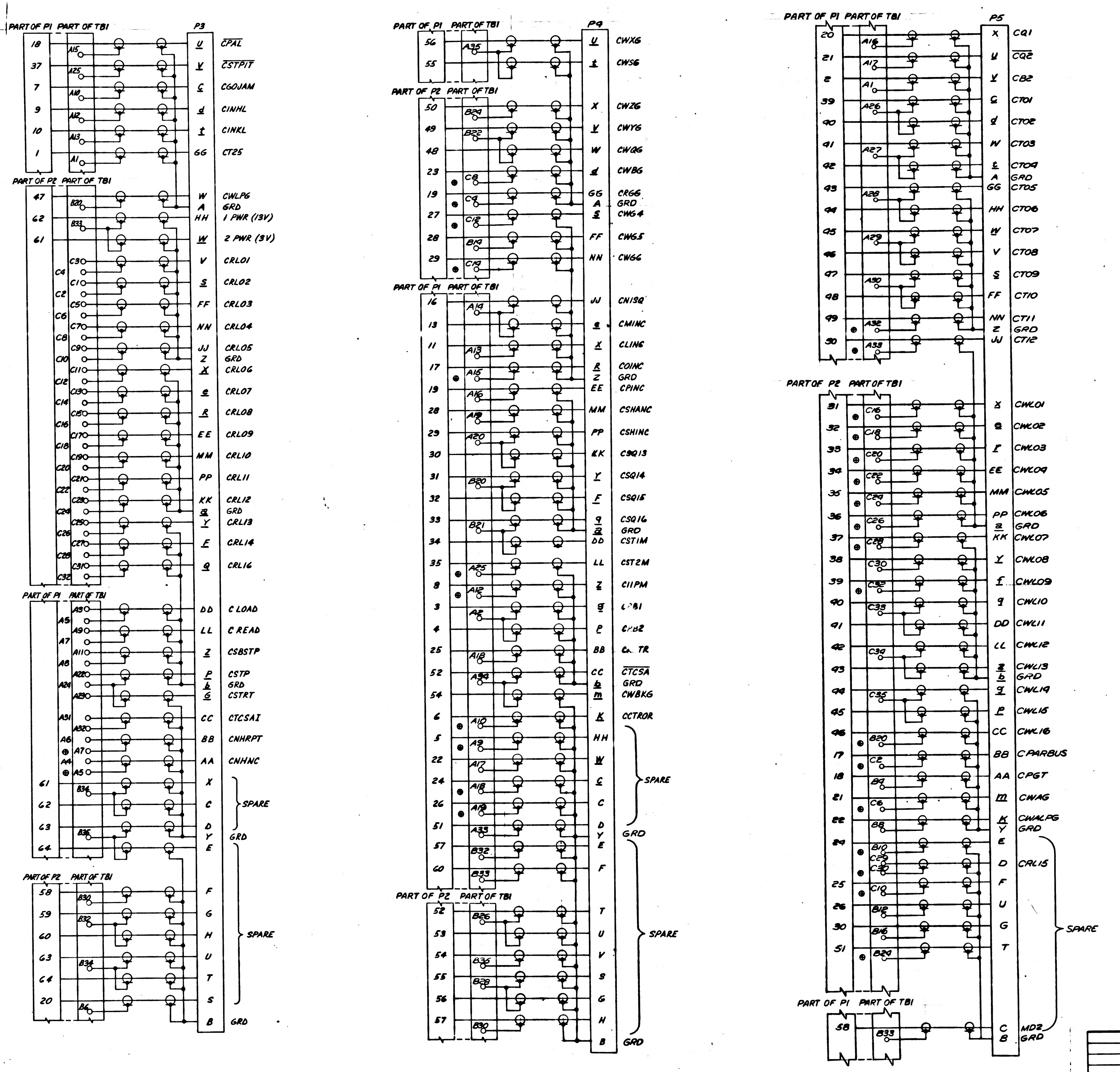
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020115
SCALE NONE
WT
SHEET 3 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

1050112

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF P1 PART OF TB1 P3
18 A15 U CPAL
37 A25 V CSTPIT
7 A10 c CGOJAM
9 A12 d CINHL
10 A13 t CINKL
1 A1 GG CT25
PART OF P2 PART OF TB1
47 B20 W CWLP6
A GRD
62 B33 HH 1 PWR (13V)
61 W 2 PWR (3V)
C3 C4 V CRL01
C1 C2 S CRL02
C5 C6 FF CRL03
C7 C8 NN CRL04
C9 C10 JJ CRL05
Z GRD
C11 C12 X CRL06
C13 C14 e CRL07
C15 C16 R CRL08
C17 C18 EE CRL09
C19 C20 MM CRL10
C21 C22 PP CRL11
C23 C24 KK CRL12
a GRD
C25 C26 Y CRL13
C27 C28 E CRL14
C31 C32 Q CRL16
PART OF P1 PART OF TB1
A3 A5 DD C LOAD
A9 A7 LL C READ
A11 A8 Z CSBSTP
A22 A24 P CSTP
b GRD
A23 G CSTRT
A31 A32 CC CTCSAI
A6 A7 BB CNHRPT
A4 A5 AA CNHNC
61 B34 X
62 C
SPARE
63 B35 D
Y GRD
64 E
PART OF P2 PART OF TB1
58 B30 F
59 B32 G
60 H
63 B34 U
64 T
20 B6 S
SPARE
B GRD
PART OF P1 PART OF TB1 P9
56 A35 U CWXG
55 t CWSG
PART OF P2 PART OF TB1
50 B24 X CWZG
49 B22 V CWYG
48 W CWQG
23 C8 d CWBG
19 C4 GG CRGG
A GRD
27 C12 S CWG4
28 B14 FF CWG5
29 C14 NN CWG6
PART OF P1 PART OF TB1
16 A14 JJ CNISQ
13 e CMINC
11 A13 X CLINC
17 A15 R COINC
Z GRD
19 A16 EE CPINC
28 A19 MM CSHANC
29 A20 PP CSHINC
30 KK CSQ13
31 B20 Y CSQ14
32 F CSQ15
33 B21 q CSQ16
a GRD
34 DD CSTIM
35 A25 LL CST2M
8 A12 Z C11PM
3 A2 g C?B1
4 P C?B2
25 A18 BB C? TR
52 A34 CC CTCSA
b GRD
54 m CWBKG
6 A10 K CCTROR
5 A9 HH
22 A17 W
24 A18 c
26 A19 C
SPARE
51 A33 D
Y GRD
57 B32 E
60 B33 F
PART OF P2 PART OF TB1
52 B26 T
53 U
54 B35 V
55 B28 S
56 G
57 B30 H
SPARE
B GRD
PART OF P1 PART OF TB1 P5
20 A16 X CQ1
21 A17 u CQ2
2 A1 V CB2
39 A26 c CT01
40 d CT02
41 A27 W CT03
42 t CT04
A GRD
43 A28 GG CT05
44 HH CT06
45 A29 W CT07
46 V CT08
47 A30 S CT09
48 FF CT10
49 A32 NN CT11
Z GRD
50 A33 JJ CT12
PART OF P2 PART OF TB1
31 C16 x CWL01
32 C18 e CWL02
33 C20 r CWL03
34 C22 EE CWL04
35 C24 MM CWL05
36 C26 PP CWL06
a GRD
37 C28 KK CWL07
38 C30 Y CWL08
39 C32 f CWL09
40 C33 q CWL10
41 DD CWL11
42 C34 LL CWL12
43 z CWL13
b GRD
44 C35 g CWL14
45 p CWL15
46 B20 CC CWL16
17 C2 BB CPARBUS
18 B4 AA CPGT
21 C6 m CWAG
22 B8 K CWALPG
Y GRD
24 B10 C29 C30 E
D CRL15
25 C10 F
26 B12 U
30 B16 G
51 B24 T
SPARE
PART OF P1 PART OF TB1
58 B33 C MD2
B GRD

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06317 DATE 2/1/64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R. Sargent DATE
CHECKED A. Caggiano
APPROVAL C. Sanden JPK
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

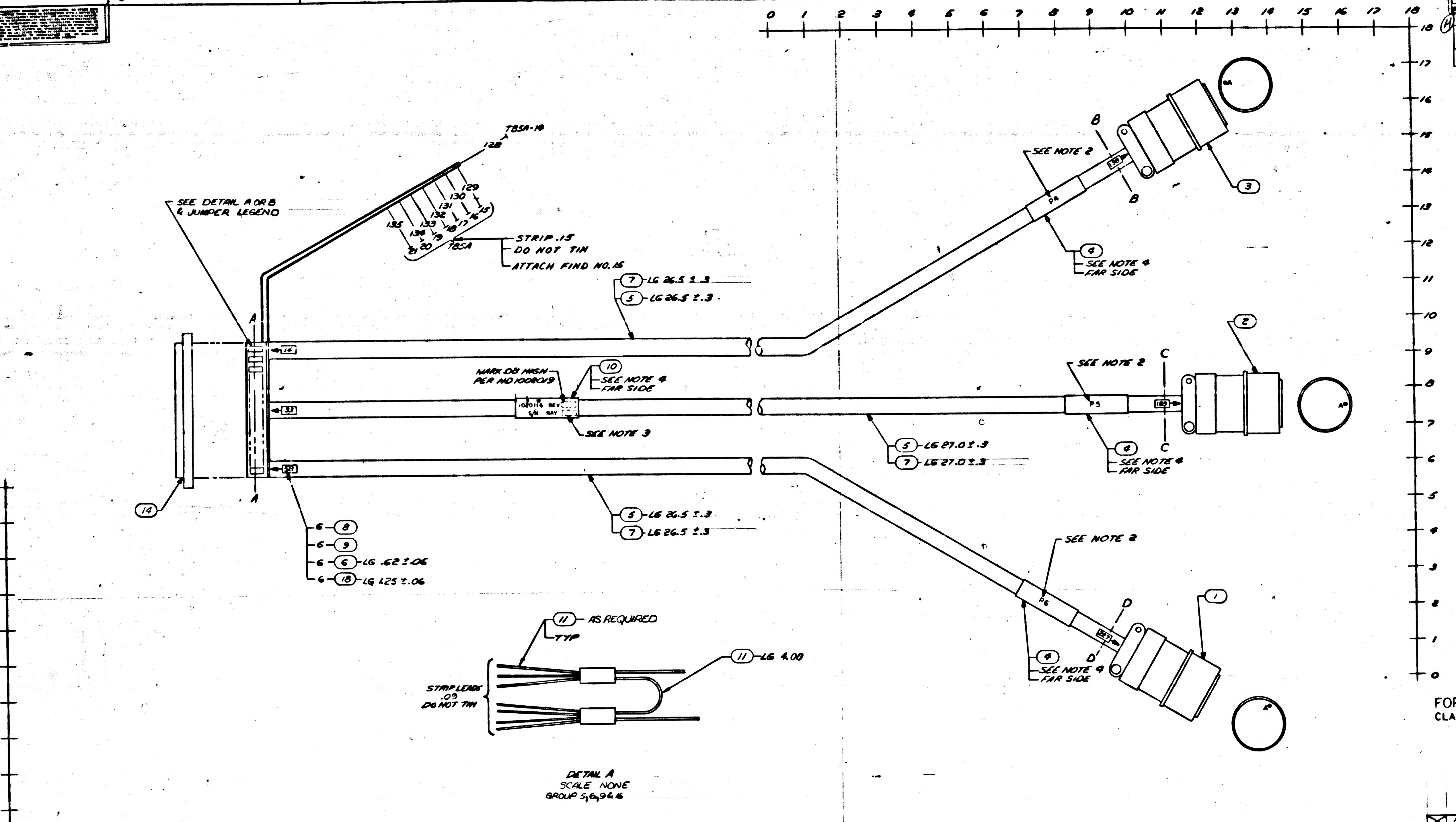
CABLE ASSEMBLY, ELECTRICAL
W51
COMPUTER TEST SET

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020115
SCALE NONE
WT
SHEET 4 OF 4

1020115

INCHES
PHOTOGRAPHIC SCALE ONLY

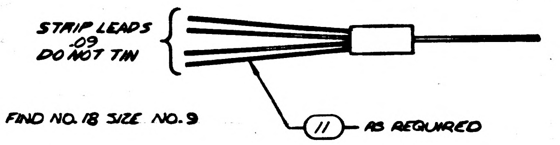
SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5890 DR. Ken Bull CHK Whitney APPD	[illegible] 64	KCB
B	CHANGED PER TDRR 08875 DR R [illegible] CHK RE Heinlen APPD [illegible]	2 Jun 64	KLB


SEE DETAIL A OR B
& JUMPER LEGEND
TBSA-14
128
129
130
131
132
133
134
135
15
16
17
18
19
20
21
TBSA
STRIP .15
DO NOT TIN
ATTACH FIND NO. 15
7 - LG 26.5 ± .3
5 - LG 26.5 ± .3
SEE NOTE 2
P4
SEE NOTE 4
FAR SIDE
B
3
MARK .08 HIGH
PER ND1002019
10
SEE NOTE 4
FAR SIDE
1020116 REV
SEE NOTE 3
SEE NOTE 2
P5
C
2
5 - LG 27.0 ± .3
7 - LG 27.0 ± .3
SEE NOTE 4
FAR SIDE
A
14
5 - LG 26.5 ± .3
7 - LG 26.5 ± .3
6 - 8
6 - 9
6 - 6 - LG .62 ± .06
6 - 18 - LG 1.25 ± .06
SEE NOTE 2
P6
D
1
SEE NOTE 4
FAR SIDE
11 - AS REQUIRED
TYP
11 - LG 4.00
STRIP LEADS
.09
DO NOT TIN

DETAIL A
SCALE NONE
GROUP 5,6,9&16

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06310 DATE 2/11/69

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631, TYPE F, FORM U, GRADE A, CLASS 1, CATEGORY 1, FOR FIND NO. 5, AWG 5/8
6. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 6 AWG 1/2, FOR FIND NO. 18 SIZE NO. 9
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
8. QQ-B-575, FOR FIND NO. 7, BRAID SIZE 1/2, AWG 34
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 14


STRIP LEADS
.09
DO NOT TIN
11 - AS REQUIRED

DETAIL B
SCALE NONE
GROUP 1,2,3,4,7,8,10,
11,12,13,14,15,17&
GROUP 18

B	A	B
A	A	A
—	—	—
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

			REF
☒	1020117	SCHEMATIC, ELECTRICAL	
* .7	SEE NOTE 6	SLEEVING	18
15	1010402-2	SLEEVE SOLDER ELECTRICAL	17
7	1010402-1	SLEEVE SOLDER ELECTRICAL	16
8	MS25036-1	TERMINAL, LUG	15
1	1010642-3	CONNECTOR	14
244	1010738-2	CONTACT, ELEC, SOCKET	13
* 293	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHITE	12
* 50.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLACK	11
1	1014472-3	BAND MARKER, CABLE	10
6	1000293-34	FERRULE, ELEC CONDUCTOR	9
6	1000292-30	FERRULE, ELEC CONDUCTOR	8
* 6.8	SEE NOTE 8	BRAID, WIRE	7
* .4	SEE NOTE 6	SLEEVING	6
* 6.8	SEE NOTE 5	SLEEVING	5
3	1014472-3A	BAND MARKER, CABLE	4
1	MS3126F-24-61SZ	CONNECTOR, PLUG	3
1	MS3126F-24-61SX	CONNECTOR, PLUG	2
1	MS3126F-24-61SY	CONNECTOR, PLUG	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1020116

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1014636	1014965

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN RDGlenn DATE 2 JAN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
SIT APPROVAL
SIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020116
SCALE 1/1
SHEET 1 OF 3

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR		
A	CLASS II CHANGE PER AD A5890 DR [illegible] CHK [illegible] APPD [illegible]	[illegible] 6"	KCB
B	CHANGE PER TDRR 08875 DR. [illegible] CHK RE. [illegible] APPD [illegible]	[illegible] 64	KCO

JUMPER LEGEND			
FROM	TO	FIND NO.	ATTACHED PARTS
J18-216	J18-50	11	FIND NO.16
-50	-97		
-97	-165		
-165	-167		GROUP 1
-64	-218		FIND NO. 16'
-218	-200		
-200	-134		GROUP 2
-237	-29		FIND NO. 17
-29	-14		
-14	-12		
-12	-184		
-184	-144		GROUP 3
-101	-239		FIND NO. 16
-239	-31		
-31	-52		
-52	-150		GROUP 4
-233	-136		FIND NO. 16
-196	-95		
-95	-68		
-68	-66		
-66	-86		
-86	-118		
-118	-178		GROUP 5
-84	-40		FIND NO. 16
-40	-120		
-120	-99		
-99	-132		
-132	-202		
-202	-128		GROUP 6
-44	-10		FIND NO. 16
-10	-198		
-198	-35		
-35	-103		GROUP 7
-163	-222		FIND NO. 16
-222	-112		
-112	-48		
-48	-108		GROUP 8
-140	-220		FIND NO. 16
-220	-214		
-214	-152		
-152	-146		
-146	-130		
-130	-161		
-161	-188		GROUP 9
-70	-6		FIND NO. 16
-6	-114		
-114	-80		
-80	-82		GROUP 10
-208	-96		FIND NO. 16
-96	-192		GROUP 11
-74	-8		FIND NO. 16
-8	-76		
-76	-235		GROUP 12
-23	-33		FIND NO. 16
-33	-58		
-58	-231		
-231	-62		GROUP 13
-91	-176		FIND NO. 16
-176	-194		
-194	-110		
-110	-116		GROUP 14
-159	-186		FIND NO. 17
-186	-4		
-4	-124		
-124	-2		
-2	-78		GROUP 15
-212	-42		FIND NO. 16
-42	-93		
-93	-126		
-126	-157		
-157	-169		
-169	-148		GROUP 16
-192	-136		FIND NO. 16
-136	-174		
-174	-60		
-60	-180		GROUP 17
-159	-210		FIND NO. 17
-210	-27		
-27	-229		
-229	-25		
J18-25	J18-182	11	GROUP 18

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	126	WHT	22	12	144	
	146				105	
	104				145	
	143	WHT		12	88	
SEE GROUP 1	**87	BLK		11	140	
	142	WHT		12	86	
	85				147	
	148				84	
	83				149	
	150	WHT		12	82	
SEE GROUP 6	**81	BLK		11	139	
	151	WHT		12	80	
	79				158	
	157				78	
	77				156	
	155				76	
	75				154	
	166				67	
	66				167	
	178				65	
	64				173	
	176				42	
	41				177	
	180				39	
	38	WHT		12	179	
	137	BLK		11	**37	SEE GROUP 5
	31	WHT		12	153	
	152	WHT		12	30	
SEE GROUP 2	**29	BLK		11	141	
	159	WHT		12	28	
	27				160	
	161				26	
	25				162	
	163				24	
	23				164	
	165				22	
	21	WHT		12	172	
	136	BLK		11	**20	SEE GROUP 3
	19	WHT		12	171	
	170				18	
	17				169	
	168				16	
	15	WHT		12	174	
ATTACH FIND NO.11 LG3.0	138	SHLD			**14	ATTACH FIND NO.11 LG 6.0 SEE GROUP 4
	13	WHT		12	175	
	125	WHT		12	211	
	186	BLK		11	124	SEE GROUP 12
	123	WHT		12	219	
	223	WHT		12	122	
SEE GROUP 9	**121	BLK		11	182	
	212	WHT		12	119	
SEE GROUP 11	**118	BLK		11	185	
	198	WHT		12	115	
	113				197	
	199				110	
	109	WHT		12	204	
	181	BLK		11	**108	SEE GROUP 7
	106	WHT		12	205	
	221				101	
	99				206	
	207				98	
	97				208	
	209				96	
	95				210	
	215				94	
	93				214	
	213				92	
	74	WHT	22	12	220	

ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	224	WHT	22	12	72	
	71				193	
	190				70	
	63				218	
	194				40	
	36				187	
	202				35	
	34	WHT		12	201	
ATTACH FIND NO.11 LG3.0	183	SHLD			**33	ATTACH FIND NO.11 LG 3.8 SEE GROUP 8
	32	WHT		12	200	
	192	WHT		12	11	
	10	WHT		12	189	
	184	BLK		11	**9	SEE GROUP 10
	8	WHT		12	191	
	217				7	
	6				216	
	127				239	
	233				120	
	117				232	
	238				116	
	114				260	
	268				112	
	111				267	
	235				107	
	103	WHT		12	259	
	228	BLK		11	**102	SEE GROUP 16
	100	WHT		12	258	
	265				91	
	90				234	
	257				89	
	73				266	
	231	WHT		12	69	
SEE GROUP 18	**68	BLK		11	230	
	249	WHT		12	62	
SEE GROUP 13	**61	BLK		11	225	
	248	WHT		12	60	
	59	WHT		12	247	
ATTACH FIND NO.11 LG3.0	227	SHLD			**58	ATTACH FIND NO.11 LG 4.3 SEE GROUP 14
	57	WHT		12	246	
	245	WHT		12	56	
	55	WHT		12	244	
	229	BLK		11	**54	SEE GROUP 17
	53	WHT		12	243	
	250				52	
	51				251	
	252	WHT		12	50	
SEE GROUP 15	**49	BLK		11	226	
	253	WHT		12	48	
	47				254	
	255				46	
	45				256	
	242				44	
	43				261	
	237				12	
	5				264	
	263				4	
	3				262	
	241				2	
	1				240	
	128				188	
	195				129	
	130				196	
	203				131	
	132				222	
	236				133	
	134				269	
	270	WHT	22	12	135	

** DENOTES RUNS REQUIRE SOLDER SLEEVE
SEE DETAIL A&B

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

1014434	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.2 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.D. [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
[illegible] APPROVAL [illegible]
[illegible] APPROVAL [illegible]

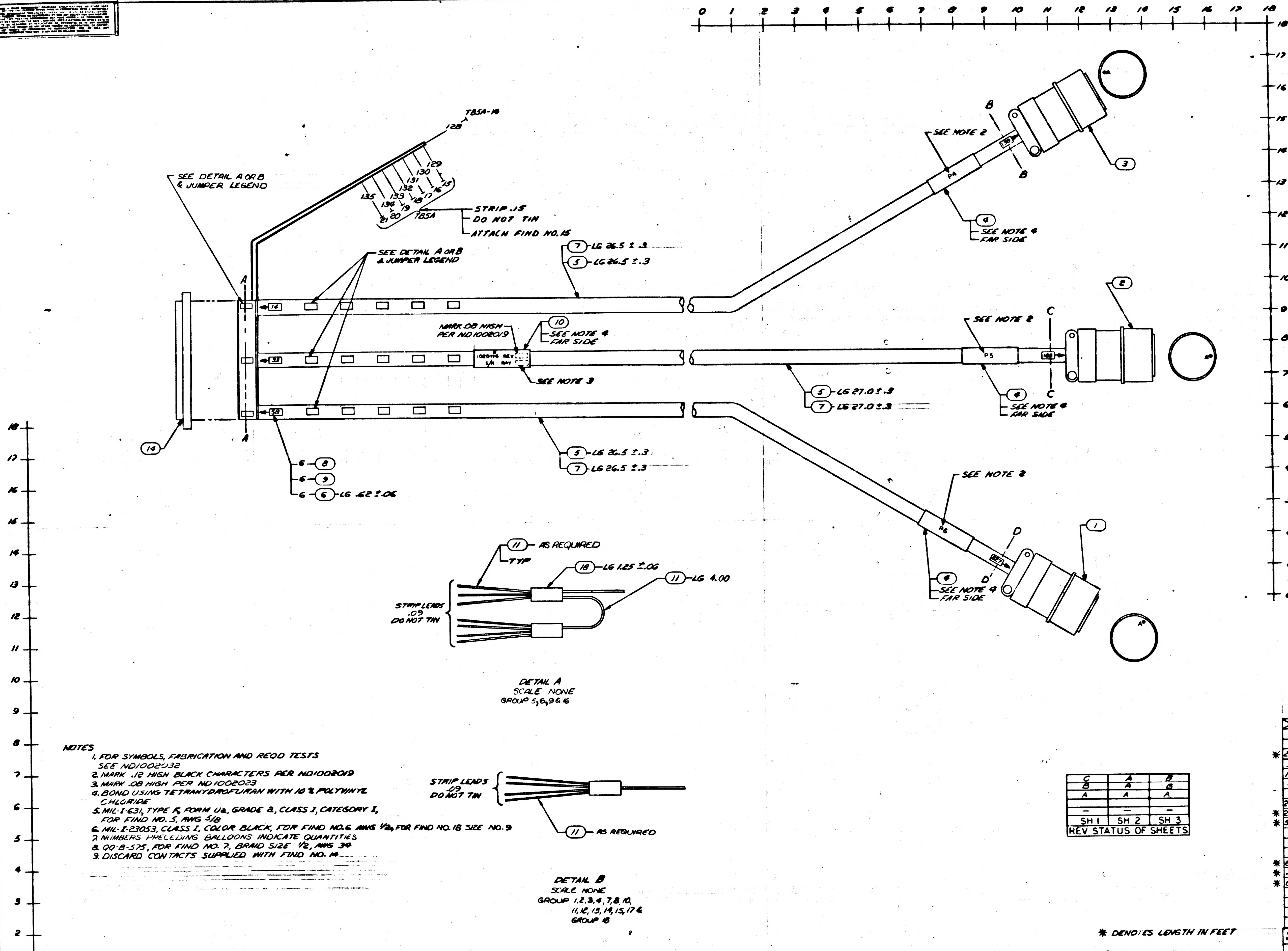
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. ——— SIZE J NASA DRAWING NO. 1020116
SCALE [illegible] WT SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CLASS II CHANGE PER RD R5890 DR Ken Bull CHK APPD	13 APR 64	KCB
B	CHANGED PER TDRR 08875 DR R CHK RE Heinke APPD	2 Jun 64	KCB
C	CHANGED PER TDRR 10983 DR Ken Bull CHK JCJ APPD	23 Jun 64	KCB


TBSA-14
128
129
130
131
132
133
134
135
15
16
17
18
19
20
21
TBSA
STRIP .15
DO NOT TIN
ATTACH FIND NO. 15
SEE DETAIL A OR B & JUMPER LEGEND
SEE DETAIL A OR B & JUMPER LEGEND
A
A
14
14
33
58
MARK .08 HIGH PER ND1002019
1020116 REV
S/N RAY
10
SEE NOTE 4 FAR SIDE
SEE NOTE 3
7 - LG 26.5 ± .3
5 - LG 26.5 ± .3
5 - LG 26.5 ± .3
7 - LG 26.5 ± .3
6 - 8
6 - 9
6 - 6 - LG .62 ± .06
5 - LG 27.0 ± .3
7 - LG 27.0 ± .3
SEE NOTE 2
P4
B
B
3
4
SEE NOTE 4 FAR SIDE
SEE NOTE 2
P5
C
C
2
4
SEE NOTE 4 FAR SIDE
SEE NOTE 2
P6
D
D
1
4
SEE NOTE 4 FAR SIDE
11 - AS REQUIRED
TYP
18 - LG 1.25 ± .06
11 - LG 4.00
STRIP LEADS .09 DO NOT TIN
STRIP LEADS .09 DO NOT TIN
11 - AS REQUIRED

DETAIL A
SCALE NONE
GROUP 5, 6, 9 & 16

DETAIL B
SCALE NONE
GROUP 1, 2, 3, 4, 7, 8, 10,
11, 12, 13, 14, 15, 17 &
GROUP 18

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10 % POLYVINYL CHLORIDE
5. MIL-I-631, TYPE F, FORM Ua, GRADE A, CLASS I, CATEGORY I, FOR FIND NO. 5, AWG 5/8
6. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 6 AWG 1/2, FOR FIND NO. 18 SIZE NO. 9
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
8. QQ-B-575, FOR FIND NO. 7, BRAID SIZE 1/2, AWG 34
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 14

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

SH 1	SH 2	SH 3
C	A	B
B	A	B
A	A	A
—	—	—

REV STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	☒	1020117	SCHEMATIC, ELECTRICAL	REF
*	2.2	SEE NOTE 6	SLEEVING	18
	3	1010402-2	SLEEVE SOLDER ELECTRICAL	17
	19	1010402-1	SLEEVE SOLDER ELECTRICAL	16
	8	MS25036-1	TERMINAL, LUG	15
	1	1010642-3	CONNECTOR	14
	244	1010738-2	CONTACT, ELEC, SOCKET	13
*	293	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHITE	12
*	50.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLACK	11
	1	1019972-3	BAND MARKER, CABLE	10
	6	1000293-34	FERRULE, ELEC CONDUCTOR	9
	6	1000292-30	FERRULE, ELEC CONDUCTOR	8
*	6.8	SEE NOTE 8	BRAID, WIRE	7
*	.4	SEE NOTE 6	SLEEVING	6
*	6.8	SEE NOTE 5	SLEEVING	5
	3	1019972-3A	BAND MARKER, CABLE	4
	1	MS3126F-24-61SZ	CONNECTOR, PLUG	3
	1	MS3126F-24-61SX	CONNECTOR, PLUG	2
	1	MS3126F-24-61SY	CONNECTOR, PLUG	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1014634	1014965

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

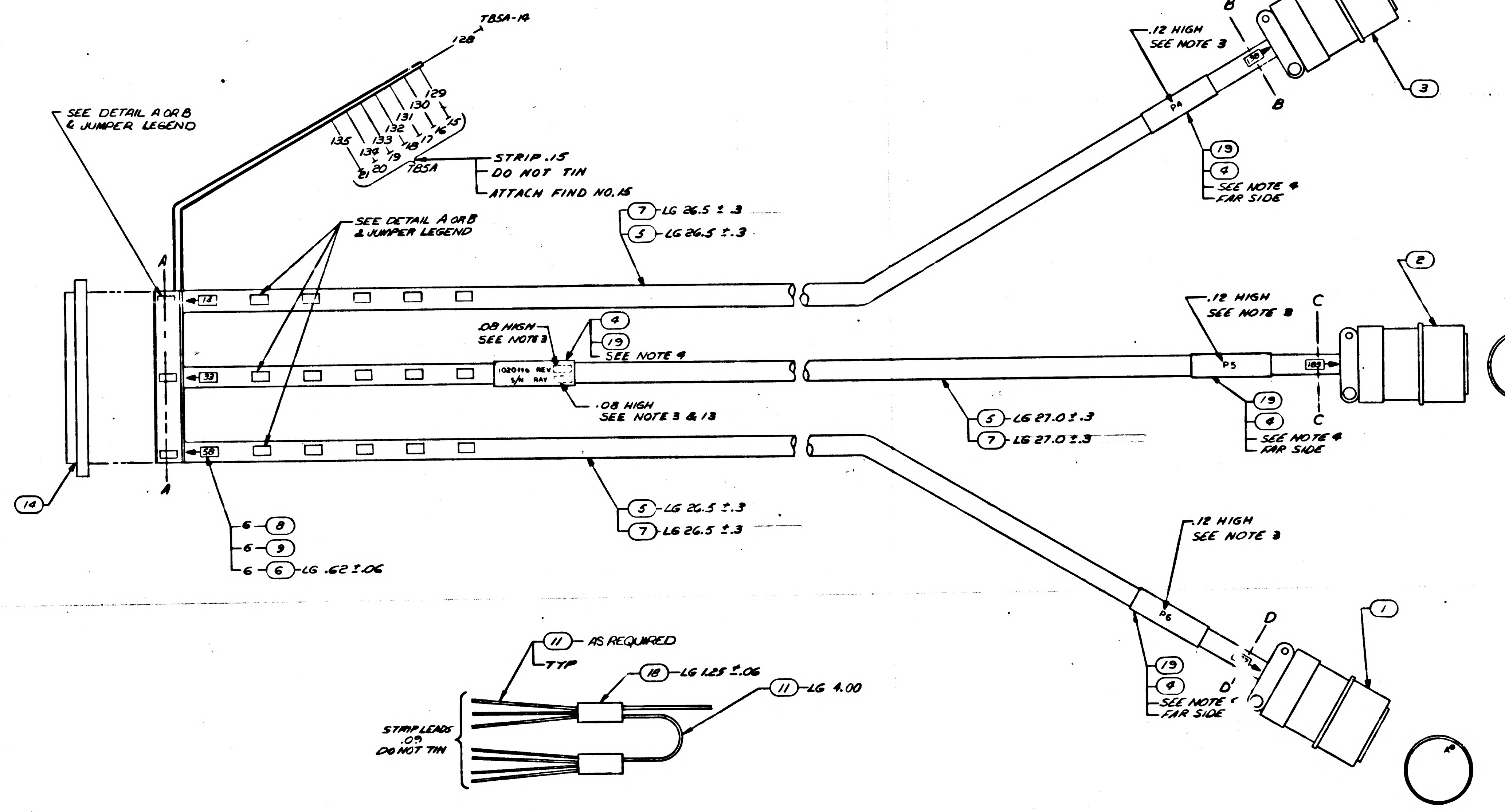
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R D Glenn DATE 2 JAN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
BIT APPROVAL
BIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

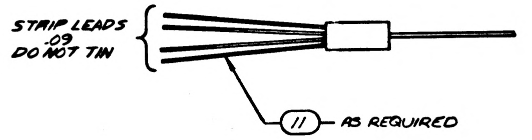
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020116
SCALE 1/1
WT
SHEET 1 OF 3

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 06320		
A	CLASS II CHANGE PER RD R5890 DR. Ken Bull CHK [illegible] APPD [illegible]	13 APR 64	KCB
B	CHANGED PER TDRR 08875 DR R [illegible] CHK RE [illegible] APPD [illegible]	2 Jun 64	KCB
C	CHANGED PER TDRR 10983 DR Ken Bull CHK [illegible] APPD [illegible]	23 Jul 64	KCB
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR. [illegible] CHK [illegible] APPD [illegible]	[illegible]	[illegible]


TBSA-14
128
129
130
131
132
133
134
135
15
16
17
18
19
20
21
TBSA
STRIP .15
DO NOT TIN
ATTACH FIND NO. 15
SEE DETAIL A OR B & JUMPER LEGEND
SEE DETAIL A OR B & JUMPER LEGEND
A
A
14
33
58
7 – LG 26.5 ± .3
5 – LG 26.5 ± .3
.08 HIGH SEE NOTE 3
4
19
SEE NOTE 4
1020116 REV
S/N RAY
.08 HIGH SEE NOTE 3 & 13
5 – LG 26.5 ± .3
7 – LG 26.5 ± .3
14
6 – 8
6 – 9
6 – 6 – LG .62 ± .06
.12 HIGH SEE NOTE 3
B
B
138
P4
3
19
4
SEE NOTE 4 FAR SIDE
2
.12 HIGH SEE NOTE 3
C
C
P5
183
5 – LG 27.0 ± .3
7 – LG 27.0 ± .3
19
4
SEE NOTE 4 FAR SIDE
.12 HIGH SEE NOTE 3
P6
D
D'
1
19
4
SEE NOTE 4 FAR SIDE

11 – AS REQUIRED
TYP
18 – LG 1.25 ± .06
11 – LG 4.00
STRIP LEADS .09 DO NOT TIN

DETAIL A
SCALE NONE
GROUP 5, 6, 9 & 16


STRIP LEADS .09 DO NOT TIN
11 – AS REQUIRED

DETAIL B
SCALE NONE
GROUP 1, 2, 3, 4, 7, 8, 10, 11, 12, 13, 14, 15, 17 & GROUP 18

NOTES

1. FOR FABRICATION SEE ND1002032
~~2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019~~
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND NO. 19
5. MIL-I-7444, TYPE I, FOR FIND NO. 5, AWG 5/8
6. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 6 SIZE 1.00 I D FOR FIND NO. 18 SIZE .250 ID
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
8. QQ-B-575, FOR FIND NO. 7, BRAID SIZE 1/2, AWG 34
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 14
10. CRIMP PER ND 1002206
11. SOLDER PER ND1002071
12. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH SUB-ASSEMBLY DESIGNATIONS
13. SERIALIZE PER ND1002023

	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
	☒	1020324	SCHEMATIC, ELECTRICAL	REF
	AR	1006253	ADHESIVE	19
*	2.2	SEE NOTE 6	SLEEVING	18
	3	1010402-2	SLEEVE SOLDER ELECTRICAL	17
	19	1010402-1	SLEEVE SOLDER ELECTRICAL	16
	8	MS25036-1	TERMINAL, LUG	15
	1	1010816-344	CONNECTOR	14
	244	1010738-2	CONTACT, ELEC, SOCKET	13
*	293	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHITE	12
*	50.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLACK	11
	~~1~~	~~1019472-3~~	~~BAND MARKER, CABLE~~	~~10~~
	6	1000293-34	FERRULE, ELEC CONDUCTOR	9
	6	1000292-30	FERRULE, ELEC CONDUCTOR	8
*	6.8	SEE NOTE 8	BRAID, WIRE	7
*	.4	SEE NOTE 6	SLEEVING	6
*	6.8	SEE NOTE 5	SLEEVING	5
	4	1019472-3A	BAND MARKER, CABLE	4
	1	MS3126F-24-61SZ	CONNECTOR, PLUG	3
	1	MS3126F-24-61SX	CONNECTOR, PLUG	2
	1	MS3126F-24-61SY	CONNECTOR, PLUG	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1020322	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

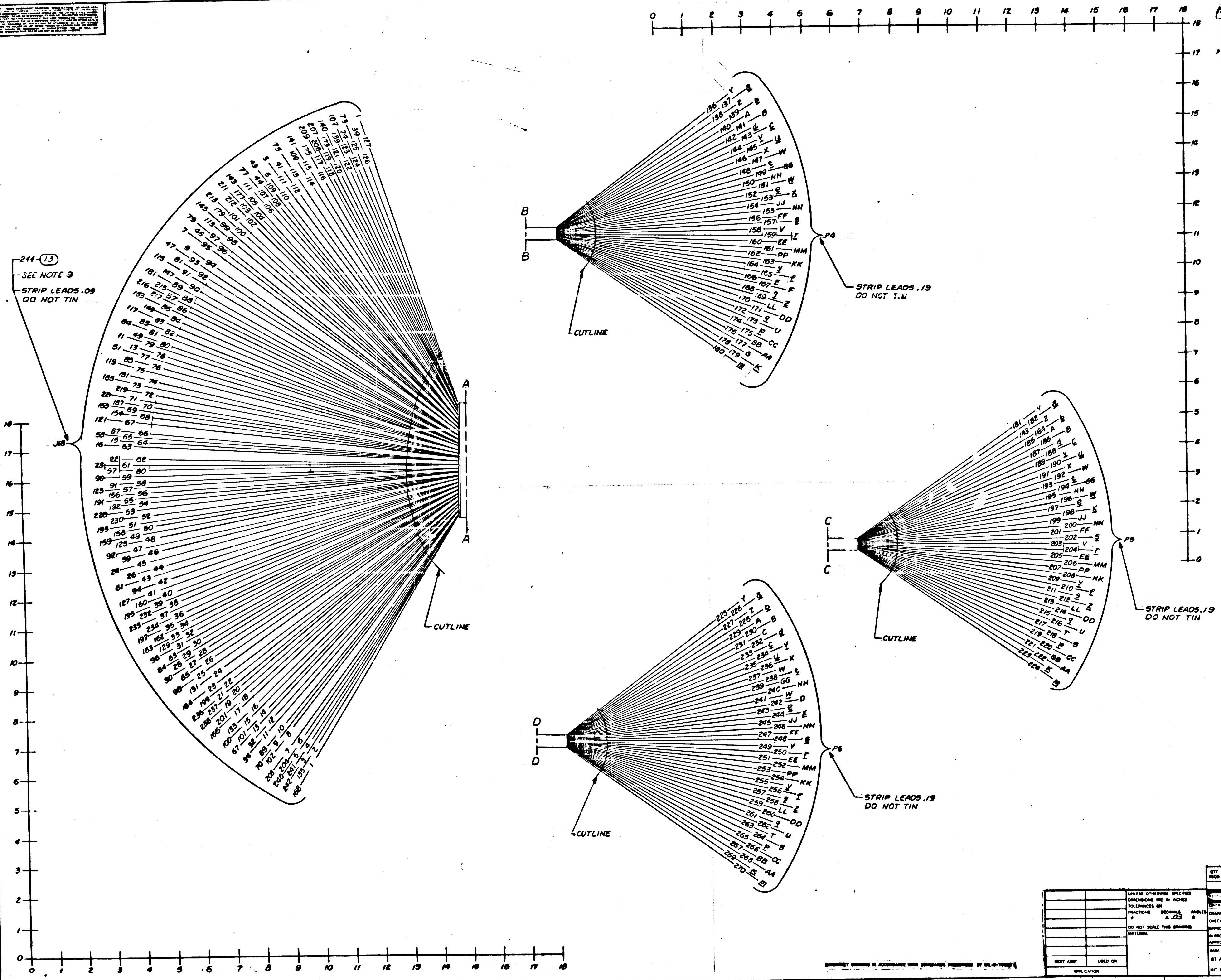
RAYTHEON CO.
LEXINGTON, MASS
CONTRACT NO NAS 9-497
DRAWN RDGlenn DATE [illegible]
CHECKED A Coggins [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020116
SCALE 1/1
WT
SHEET 1 OF 3

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 63??		
A	CLASS II CHANGE PER RD A5890 DR. Ken Beall CHK [illegible] APPD [illegible]	23 APR 64	KLS
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR. J. May CHK G Coggins APPD [illegible]	[illegible]	KCR



244-(13)
SEE NOTE 9
STRIP LEADS .09
DO NOT TIN
J18
A
A
CUTLINE
B
B
CUTLINE
P4
STRIP LEADS .19
DO NOT TIN
C
C
CUTLINE
P5
STRIP LEADS .19
DO NOT TIN
D
D
CUTLINE
P6
STRIP LEADS .19
DO NOT TIN
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN W. Carlson DATE [illegible]
CHECKED S. Coggins [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO — | SIZE J | NASA DRAWING NO 1020116
SCALE 1/1 | WT | SHEET 2 OF 3

1020116

1020116 D

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CLB RELEASED PER TDRR 06320		
A	CLASS II CHANGE PER RD A5890 DR Ken Budd CHK APPD	23APR 64	KCB
B	CHANGE PER TDRR 08875 DR. CHK APPD	64	KEB
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR CHK APPD		

JUMPER LEGEND

FROM	TO	FIND NO.	ATTACHED PARTS
J18-216	J18-50	11	FIND NO.16
-50	-97		
-97	-165		
-165	-167		GROUP 1
-64	-218		FIND NO. 16
-218	-200		
-200	-134		GROUP 2
-237	-29		FIND NO. 17
-29	-14		
-14	-12		
-12	-184		
-184	-144		GROUP 3
-101	-239		FIND NO. 16
-239	-31		
-31	-52		
-52	-150		GROUP 4
-233	-196		FIND NO. 16
-196	-95		
-95	-68		
-68	-66		
-66	-86		
-86	-118		
-118	-178		GROUP 5
-84	-40		FIND NO. 16
-40	-120		
-120	-99		
-99	-132		
-132	-202		
-202	-128		GROUP 6
-44	-10		FIND NO. 16
-10	-198		
-198	-35		
-35	-103		GROUP 7
-163	-222		FIND NO. 16
-222	-112		
-112	-48		
-48	-108		GROUP 8
-140	-220		FIND NO. 16
-220	-214		
-214	-152		
-152	-146		
-146	-130		
-130	-161		
-161	-188		GROUP 9
-70	-6		FIND NO. 16
-6	-114		
-114	-80		
-80	-82		GROUP 10
-208	-46		FIND NO. 16
-46	-142		GROUP 11
-74	-8		FIND NO. 16
-8	-76		
-76	-235		GROUP 12
-23	-33		FIND NO. 16
-33	-58		
-58	-231		
-231	-62		GROUP 13
-91	-176		FIND NO. 16
-176	-194		
-194	-110		
-116	-116		GROUP 14
-159	-186		FIND NO. 17
-186	-4		
-4	-124		
-124	-2		
-2	-78		GROUP 15
-212	-42		FIND NO. 16
-42	-93		
-93	-126		
-126	-157		
-157	-169		
-169	-148		GROUP 16
-192	-136		FIND NO. 16
-136	-174		
-174	-60		
-60	-180		GROUP 17
-159	-210		FIND NO. 17
-210	-27		
-27	-229		
-229	-25		
J18-25	J18-182	11	GROUP 18

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	126	WHT	22	12	144	
	146				105	
	104				145	
	143	WHT		12	88	
SEE GROUP 1	**87	BLK		11	140	
	142	WHT		12	86	
	85				147	
	148				84	
	83				149	
	150	WHT		12	82	
SEE GROUP 6	**81	BLK		11	139	
	151	WHT		12	80	
	79				158	
	157				78	
	77				156	
	155				76	
	75				154	
	166				67	
	66				167	
	178				65	
	64				173	
	176				42	
	41				177	
	180				39	
	38	WHT		12	179	
	137	BLK		11	**37	SEE GROUP 5
	31	WHT		12	153	
	152	WHT		12	30	
SEE GROUP 2	**29	BLK		11	141	
	159	WHT		12	28	
	27				160	
	161				26	
	25				162	
	163				24	
	23				164	
	165				22	
	21	WHT		12	172	
	136	BLK		11	**20	SEE GROUP 3
	19	WHT		12	171	
	170				18	
	17				169	
	168				16	
	15	WHT		12	174	
ATTACH FIND NO.11 LG3.0	138	SHLD			**14	ATTACH FIND NO.11 LG 6.0
	13	WHT		12	175	SEE GROUP 4
	125	WHT		12	211	
	186	BLK		11	124	SEE GROUP 12
	123	WHT		12	219	
	223	WHT		12	122	
SEE GROUP 9	**121	BLK		11	182	
	212	WHT		12	119	
SEE GROUP 11	**118	BLK		11	185	
	198	WHT		12	115	
	113				197	
	199				110	
	109	WHT		12	204	
	181	BLK		11	**108	SEE GROUP 7
	106	WHT		12	205	
	221				101	
	99				206	
	207				98	
	97				208	
	209				96	
	95				210	
	215				94	
	93				214	
	213				92	
	74	WHT	22	12	220	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	224	WHT	22	12	72	
	71				193	
	190				70	
	63				218	
	194				40	
	36				187	
	202				35	
	34	WHT		12	201	
ATTACH FIND NO.11 LG3.0	183	SHLD			**33	ATTACH FIND NO.11 LG 3.8
	32	WHT		12	200	SEE GROUP 8
	192	WHT		12	11	
	10	WHT		12	189	
	184	BLK		11	**9	SEE GROUP 10
	8	WHT		12	191	
	217				7	
	6				216	
	127				239	
	233				120	
	117				232	
	238				116	
	114				260	
	268				112	
	111				267	
	235				107	
	103	WHT		12	259	
	228	BLK		11	**102	SEE GROUP 16
	100	WHT		12	258	
	265				91	
	90				234	
	257				89	
	73				266	
	231	WHT		12	69	
SEE GROUP 18	**68	BLK		11	230	
	249	WHT		12	62	
SEE GROUP 13	**61	BLK		11	225	
	248	WHT		12	60	
	59	WHT		12	247	
ATTACH FN NO.11 LG3.0	227	SHLD			**58	ATTACH FIND NO.11 LG 4.9
	57	WHT		12	246	SEE GROUP 14
	245	WHT		12	56	
	55	WHT		12	244	
	229	BLK		11	**54	SEE GROUP 17
	53	WHT		12	243	
	250				52	
	51				251	
	252	WHT		12	50	
SEE GROUP 15	**49	BLK		11	226	
	253	WHT		12	48	
	47				254	
	255				46	
	45				256	
	242				44	
	43				261	
	237				12	
	5				264	
	263				4	
	3				262	
	241				2	
	1				240	
	128				188	
	195				129	
	130				196	
	203				131	
	132				222	
	236				133	
	134				269	
	270	WHT	22	12	135	

** DENOTES RUNS REQUIRE SOLDER SLEEVE
SEE DETAIL A&B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.2 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. DATE
CHECKED A. 28 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

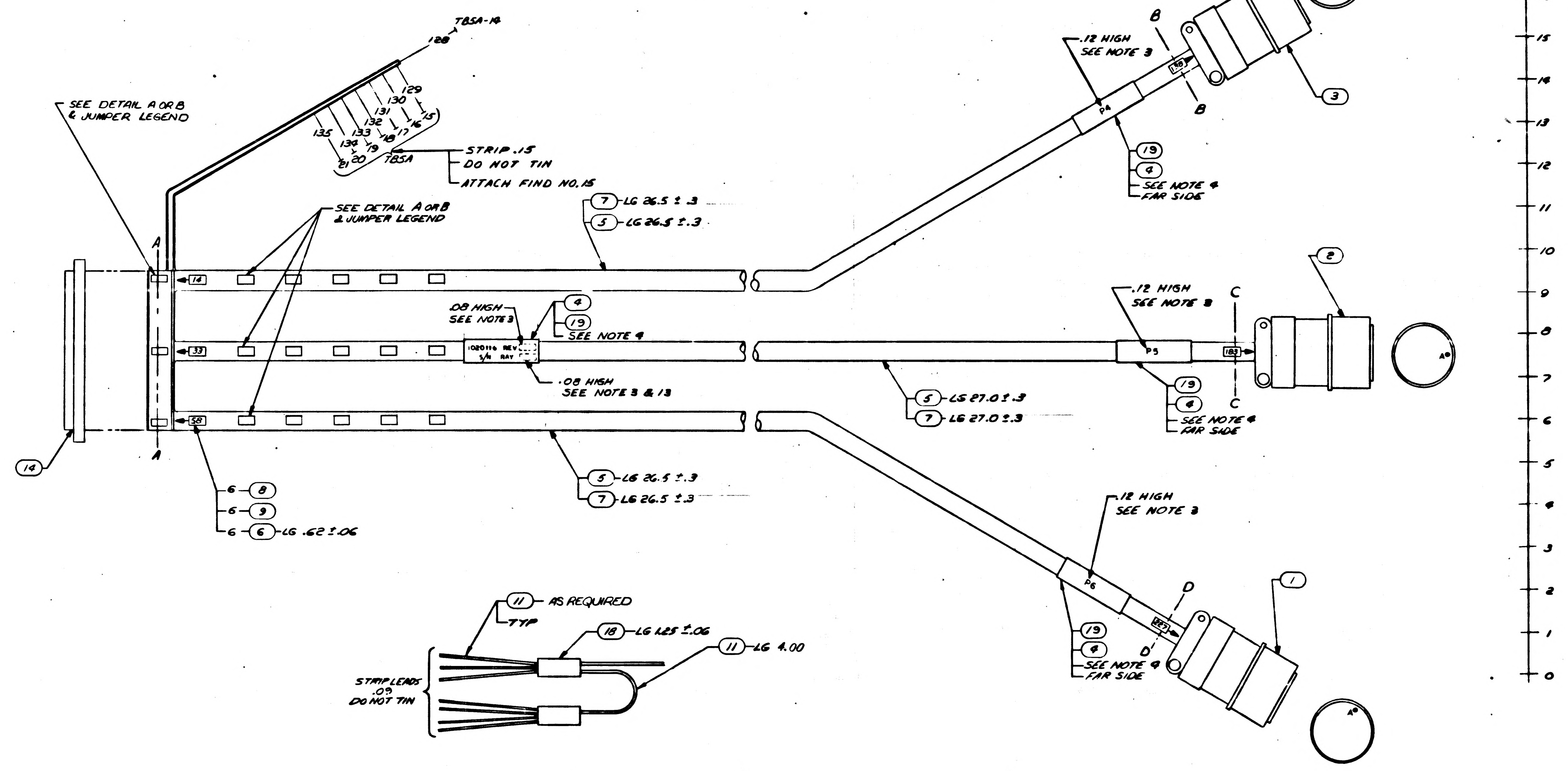
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020116
SCALE NONE
WT
SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

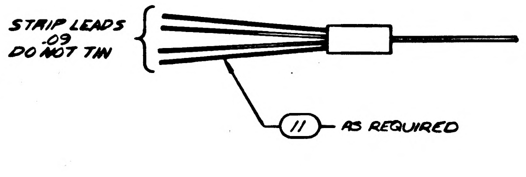
SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06320		
A	CLASS II CHANGE PER RD R5890 DR. Ken Bull CHK [illegible] APPD [illegible]	23 APR 64	K.C.B
B	CHANGED PER TDRR 08875 DR [illegible] CHK R E [illegible] APPD [illegible]	2 Jun 64	K.C.B
C	CHANGED PER TDRR 10983 DR Ken Bull CHK J.J. APPD [illegible]	23 [illegible] 64	K.C.B
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR. [illegible] CHK [illegible] APPD [illegible]	[illegible]	[illegible]
E	CHANGED PER TDRR 19714 DR. [illegible] CHK [illegible] APPD [illegible]	[illegible]	[illegible]


TBSA-14
128
129
130
131
132
133
134
135
15
16
17
18
19
20
21
TBSA
STRIP .15
DO NOT TIN
ATTACH FIND NO. 15
SEE DETAIL A OR B & JUMPER LEGEND
SEE DETAIL A OR B & JUMPER LEGEND
A
A
14
33
50
7 -LG 26.5 ± .3
5 -LG 26.5 ± .3
.08 HIGH SEE NOTE 3
4
19
SEE NOTE 4
1020116 REV
S/N RAY
.08 HIGH SEE NOTE 3 & 13
5 -LG 27.0 ± .3
7 -LG 27.0 ± .3
5 -LG 26.5 ± .3
7 -LG 26.5 ± .3
6 - 8
6 - 9
6 - 6 -LG .62 ± .06
14
.12 HIGH SEE NOTE 3
B
B
P4
3
19
4
SEE NOTE 4 FAR SIDE
.12 HIGH SEE NOTE 3
C
C
P5
2
19
4
SEE NOTE 4 FAR SIDE
.12 HIGH SEE NOTE 3
D
D
P6
1
19
4
SEE NOTE 4 FAR SIDE
11 - AS REQUIRED
TYP
18 -LG 1.25 ± .06
11 -LG 4.00
STRIP LEADS .09 DO NOT TIN

DETAIL A
SCALE NONE
GROUP 5, 6, 9 & 16

NOTES

1. FOR FABRICATION SEE ND1002032
2. ~~MARK .12 HIGH BLACK CHARACTERS PER ND1002019~~
3. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
4. BOND USING FIND NO. 19
5. MIL-I-631 TYPE F, FORM U2, GRADE A, CLASS I, CATEGORY 1 FOR FIND NO. 5, AWG 5/8
6. MIL-I-23053, CLASS 1, COLOR BLACK, FOR FIND NO. 6 SIZE 1.00 ID FOR FIND NO. 18 SIZE .250 ID
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
8. QQ-B-575, FOR FIND NO. 7, BRAID SIZE 1/2, AWG 34
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 14
10. CRIMP PER ND 1002206
11. SOLDER PER ND1002071
12. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH SUB-ASSEMBLY DESIGNATIONS
13. SERIALIZE PER ND1002023


STRIP LEADS .09 DO NOT TIN
11 - AS REQUIRED

DETAIL B
SCALE NONE
GROUP 1, 2, 3, 4, 7, 8, 10, 11, 12, 13, 14, 15, 17 & GROUP 18

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1020324	SCHEMATIC, ELECTRICAL	REF
AR	1006253	ADHESIVE	19
* 2.2	SEE NOTE 6	SLEEVING	18
3	1010402-2	SLEEVE SOLDER ELECTRICAL	17
19	1010402-1	SLEEVE SOLDER ELECTRICAL	16
8	MS25036-1	TERMINAL, LUG	15
1	1010816-344	CONNECTOR	14
244	1010738-2	CONTACT, ELEC, SOCKET	13
* 293	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHITE	12
* 50.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLACK	11
~~1~~	~~1019472-3~~	~~BAND MARKER, CABLE~~	~~10~~
6	1000293-34	FERRULE, ELEC CONDUCTOR	9
6	1000292-30	FERRULE, ELEC CONDUCTOR	8
* 6.8	SEE NOTE 8	BRAID, WIRE	7
* .4	SEE NOTE 6	SLEEVING	6
* 6.8	SEE NOTE 5	SLEEVING	5
4	1019472-3A	BAND MARKER, CABLE	4
1	MS3126F-24-61SZ	CONNECTOR, PLUG	3
1	MS3126F-24-61SX	CONNECTOR, PLUG	2
1	MS3126F-24-61SY	CONNECTOR, PLUG	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NEXT ASSY	USED ON
1020322	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

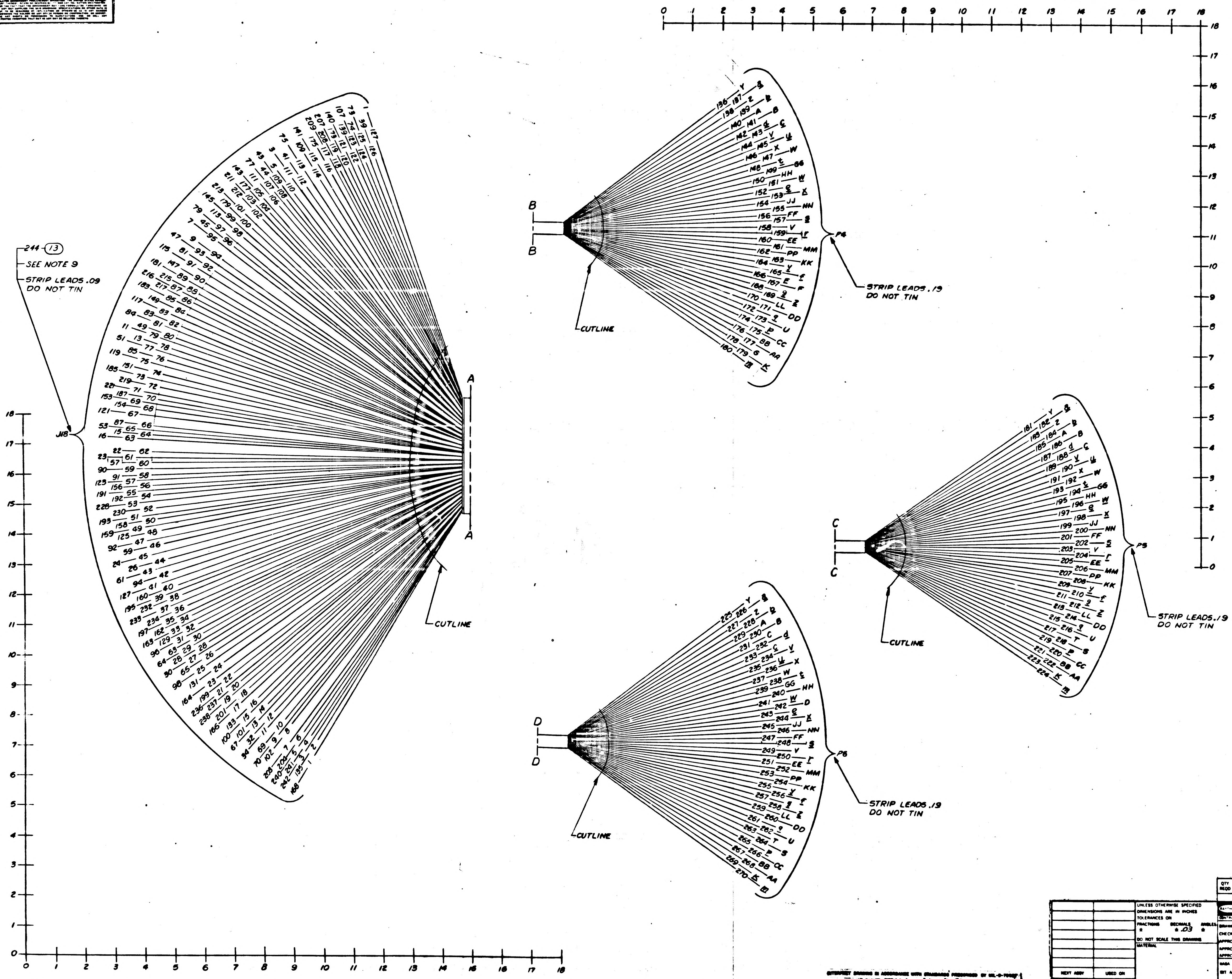
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-496
DRAWN R D Glenn DATE 2 JAN
CHECKED A [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020116
SCALE 1/1
WT
SHEET 1 OF 3

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 6320		
A	CLASS II CHANGE PER RD R5890 DR. Ken Buell CHK APPD	23 APR 64	KGB
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR J. May CHK G. Coggins APPD	16 APR 65	KGB
E	CHANGED PER TDRR 19714 DR P. Irvine CHK APPD	26 JUNE 65	



244-⑬
SEE NOTE 9
STRIP LEADS .09
DO NOT TIN
J18
A
A
CUTLINE
B
B
CUTLINE
P4
STRIP LEADS .19
DO NOT TIN
C
C
CUTLINE
P5
STRIP LEADS .19
DO NOT TIN
D
D
CUTLINE
P6
STRIP LEADS .19
DO NOT TIN
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED S. Coggins
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX

AGC/CTS OPERATION CONSOLE

CODE IDENT NO — SIZE J NASA DRAWING NO 1020116
SCALE 1/1 WT SHEET 2 OF 3

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06320		
A	CLASS II CHANGE PER AD M5890 DR CHK APPD	23 APR 64	KCB
B	CHANGE PER TDRR 08875 DR. CHK R.E. APPD	9 JUN 64	KCB
D	UPGRADE TO CLASS A WITH CHANGES PER TDRR 17529 DR CHK APPD	APR 65	KCB
E	CHANGED PER TDRR 19714 DR. CHK APPD		

JUMPER LEGEND

FROM	TO	FIND NO.	ATTACHED PARTS
J18-216	J18-50	11	FIND NO.16
-50	-97		
-97	-165		
-165	-167		GROUP 1
-64	-218		FIND NO. 16
-218	-200		
-200	-134		GROUP 2
-237	-29		FIND NO. 17
-29	-14		
-14	-12		
-12	-184		
-184	-144		GROUP 3
-101	-239		FIND NO. 16
-239	-31		
-31	-52		
-52	-150		GROUP 4
-233	-196		FIND NO. 16
-196	-95		
-95	-68		
-68	-66		
-66	-86		
-86	-118		
-118	-178		GROUP 5
-84	-40		FIND NO. 16
-40	-120		
-120	-99		
-99	-132		
-132	-202		
-202	-128		GROUP 6
-44	-10		FIND NO 16
-10	-198		
-198	-35		
-35	-103		GROUP 7
-163	-222		FIND NO. 16
-222	-112		
-112	-48		
-48	-108		GROUP 8
-140	-220		FIND NO. 16
-220	-214		
-214	-152		
-152	-146		
-146	-130		
-130	-161		
-161	-188		GROUP 9
-70	-6		FIND NO. 16
-6	-114		
-114	-80		
-80	-82		GROUP 10
-208	-46		FIND NO. 16
-46	-142		GROUP 11
-74	-8		FIND NO. 16
-8	-76		
-76	-235		GROUP 12
-23	-33		FIND NO. 16
-33	-58		
-58	-231		
-231	-62		GROUP 13
-91	-176		FIND NO. 16
-176	-194		
-194	-110		
-110	-116		GROUP 14
-159	-186		FIND NO. 17
-186	-4		
-4	-124		
-124	-2		
-2	-78		GROUP 15
-212	-42		FIND NO. 16
-42	-93		
-93	-126		
-126	-157		
-157	-169		
-169	-148		GROUP 16
-192	-136		FIND NO. 16
-136	-174		
-174	-60		
-60	-180		GROUP 17
-159	-210		FIND NO. 17
-210	-27		
-27	-229		
-229	-25		
J18-25	J18-182	11	GROUP 18

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	126	WHT	22	12	144	
	146				105	
	104				145	
	143	WHT		12	88	
SEE GROUP 1	**87	BLK		11	140	
	142	WHT		12	86	
	85				147	
	148				84	
	83				149	
	150	WHT		12	82	
SEE GROUP 6	**81	BLK		11	139	
	151	WHT		12	80	
	79				158	
	157				78	
	77				156	
	155				76	
	75				154	
	166				67	
	66				167	
	178				65	
	64				173	
	176				42	
	41				177	
	180				39	
	38	WHT		12	179	
	137	BLK		11	**37	SEE GROUP 5
	31	WHT		12	153	
	152	WHT		12	30	
SEE GROUP 2	**29	BLK		11	141	
	159	WHT		12	28	
	27				160	
	161				26	
	25				162	
	163				24	
	23				164	
	165				22	
	21	WHT		12	172	
	136	BLK		11	**20	SEE GROUP 3
	19	WHT		12	171	
	170				18	
	17				169	
	168				16	
	15	WHT		12	174	
ATTACH FIND NO.11 LG3.0	138	SHLD			**14	ATTACH FIND NO.11 LG 6.0
	13	WHT		12	175	SEE GROUP 4
	125	WHT		12	211	
	186	BLK		11	124	SEE GROUP 12
	123	WHT		12	219	
	223	WHT		12	122	
SEE GROUP 9	**121	BLK		11	182	
	212	WHT		12	119	
SEE GROUP 11	**118	BLK		11	185	
	198	WHT		12	115	
	113				197	
	199				110	
	109	WHT		12	204	
	181	BLK		11	**108	SEE GROUP 7
	106	WHT		12	205	
	221				101	
	99				206	
	207				98	
	97				208	
	209				96	
	95				210	
	215				94	
	93				214	
	213				92	
	74	WHT	22	12	220	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	224	WHT	22	12	72	
	71				193	
	190				70	
	63				218	
	194				40	
	36				187	
	202				35	
	34	WHT		12	201	
ATTACH FIND NO.11 LG 3.0	183	SHLD			**33	ATTACH FIND NO.11 LG 3.8
	32	WHT		12	200	SEE GROUP 8
	192	WHT		12	11	
	10	WHT		12	189	
	184	BLK		11	**9	SEE GROUP 10
	8	WHT		12	191	
	217				7	
	6				216	
	127				239	
	233				120	
	117				232	
	238				116	
	114				260	
	268				112	
	111				267	
	235				107	
	103	WHT		12	259	
	228	BLK		11	**102	SEE GROUP 16
	100	WHT		12	258	
	265				91	
	90				234	
	257				89	
	73				266	
	231	WHT		12	69	
SEE GROUP 18	**68	BLK		11	230	
	249	WHT		12	62	
SEE GROUP 13	**61	BLK		11	225	
	248	WHT		12	60	
	59	WHT		12	247	
ATTACH FIND NO.11 LG3.0	227	SHLD			**58	ATTACH FIND NO.11 LG 4.3
	57	WHT		12	246	SEE GROUP 14
	245	WHT		12	56	
	55	WHT		12	244	
	229	BLK		11	**54	SEE GROUP 17
	53	WHT		12	243	
	250				52	
	51				251	
	252	WHT		12	50	
SEE GROUP 15	**49	BLK		11	226	
	253	WHT		12	48	
	47				254	
	255				46	
	45				256	
	242				44	
	43				261	
	237				12	
	5				264	
	263				4	
	3				262	
	241				2	
	1				240	
	128				188	
	195				129	
	130				196	
	203				131	
	132				222	
	236				133	
	134				269	
	270	WHT	22	12	135	

** DENOTES RUNS REQUIRE SOLDER SLEEVE
SEE DETAIL A&B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.2 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

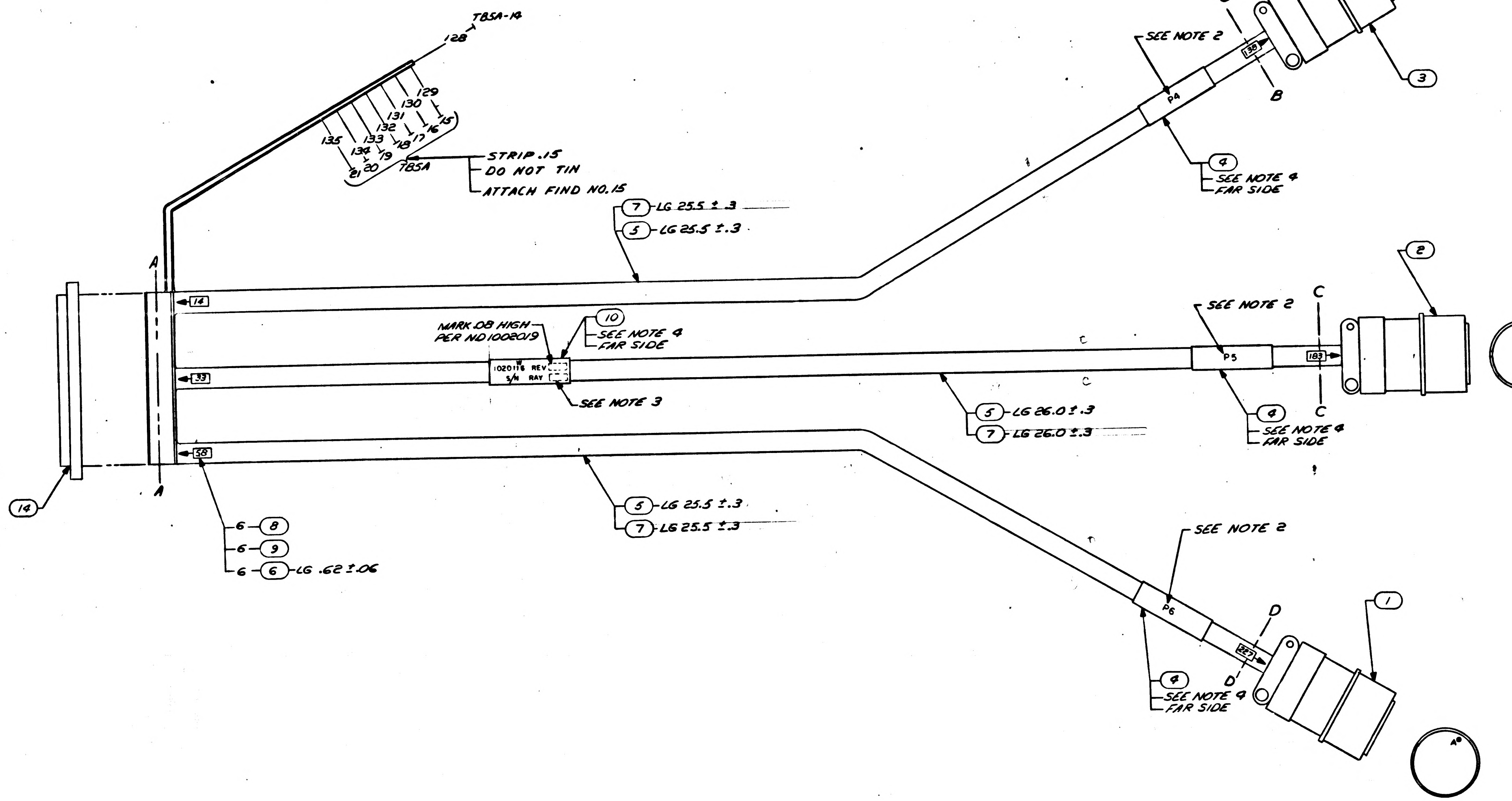
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020116
SCALE NONE WT SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR		


TB5A-14
128
129
130
131
132
133
134
135
15
16
17
18
19
20
21
TB5A
STRIP .15
DO NOT TIN
ATTACH FIND NO. 15
7 LG 25.5 ± .3
5 LG 25.5 ± .3
A
A
14
33
58
14
MARK .08 HIGH PER ND1002019
10
SEE NOTE 4 FAR SIDE
1020116 REV
S/N RAY
SEE NOTE 3
5 LG 26.0 ± .3
7 LG 26.0 ± .3
5 LG 25.5 ± .3
7 LG 25.5 ± .3
6 8
6 9
6 6 LG .62 ± .06
SEE NOTE 2
P4
B
B
136
3
4 SEE NOTE 4 FAR SIDE
SEE NOTE 2
C
C
P5
182
2
4 SEE NOTE 4 FAR SIDE
SEE NOTE 2
P6
D
D
227
1
4 SEE NOTE 4 FAR SIDE

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06310 DATE 2/14/69

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO. 4 AND 10 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, FOR FIND NO. 5, AWG 5/8
6. MIL-I-23053, CLASS I, COLOR BLACK, FOR FIND NO. 6 AWG 1/2
7. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
8. QQ-B-575, FOR FIND NO. 7, BRAID SIZE 1/2, AWG 34
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 14

–	–	–
SH 1	SH 2	SH 3

REV STATUS OF SHEETS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1020117	SCHEMATIC, ELECTRICAL	REF
8	MS25036-1	TERMINAL, LUG	15
1	1010642-3	CONNECTOR	14
244	1010738-2	CONTACT, ELEC, SOCKET	13
* 293	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHITE	12
* 50.0	MIL-W-16878/4, TYPE E 26	WIRE, ELECTRICAL, BLACK	11
1	1019472-3	BAND MARKER, CABLE	10
6	1000293-37	FERRULE, ELEC CONDUCTOR	9
6	1000242-33	FERRULE, ELEC CONDUCTOR	8
* 6.5	SEE NOTE 8	BRAID, WIRE	7
* .4	SEE NOTE 6	SLEEVING	6
* 6.5	SEE NOTE 5	SLEEVING	5
3	1019472-3A	BAND MARKER, CABLE	4
1	MS3126F-24-61SZ	CONNECTOR, PLUG	3
1	MS3126F-24-61SX	CONNECTOR, PLUG	2
1	MS3126F-24-61SY	CONNECTOR, PLUG	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

NEXT ASSY	USED ON
1014434	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN RDG DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

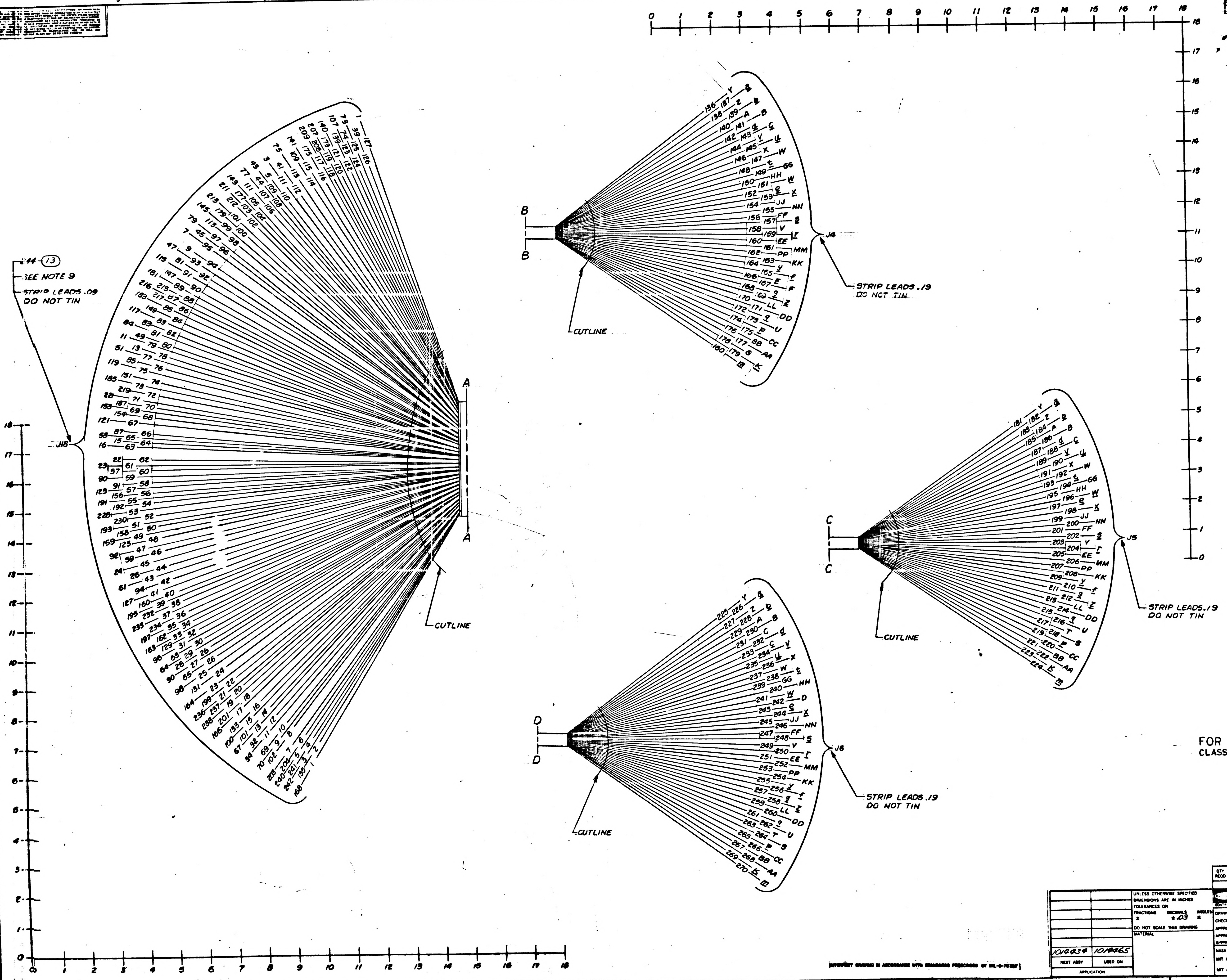
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 1020116
SCALE 1/1 WT SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


244-(13)
SEE NOTE 9
STRIP LEADS .09
DO NOT TIN
J18
A
A
CUTLINE
B
B
CUTLINE
J14
STRIP LEADS .19
DO NOT TIN
C
C
CUTLINE
J5
STRIP LEADS .19
DO NOT TIN
D
D
CUTLINE
J6
STRIP LEADS .19
DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1019234	1019465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO
LEXINGTON, MASS
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE 10 Jan 64
CHECKED A. Caggiano 22 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-10-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020116
SCALE 1/1
WT
SHEET 2 OF 3

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR		

JUMPER LEGEND

FROM	TO	FIND NO.	ATTACHED PARTS
J18-216	J18-50	11	FIND NO.13
-50	-97		
-97	-165		
-165	-167		
-64	-218		
-218	-200		
-200	-134		
-237	-29		
-29	-14		
-14	-12		
-12	-184		
-184	-144		
-101	-239		
-239	-31		
-31	-52		
-52	-150		
-233	-196		
-196	-95		
-95	-68		
-68	-66		
-66	-86		
-86	-118		
-118	-178		
-84	-40		
-40	-120		
-120	-99		
-99	-132		
-132	-202		
-202	-128		
-44	-10		
-10	-198		
-198	-35		
-35	-103		
-163	-222		
-222	-112		
-112	-48		
-48	-108		
-140	-220		
-220	-214		
-214	-152		
-152	-146		
-146	-130		
-130	-161		
-161	-188		
-70	-6		
-6	-114		
-114	-80		
-80	-82		
-118	-46		
-46	-192		
-124	-8		
-8	-76		
-76	-235		
-23	-33		
-33	-58		
-58	-231		
-231	-62		
-91	-176		
-176	-194		
-194	-110		
-110	-116		
-159	-186		
-186	-4		
-4	-124		
-124	-2		
-2	-78		
-212	-42		
-42	-93		
-93	-126		
-126	-157		
-157	-169		
-169	-198		
-54	-136		
-136	-174		
-174	-60		
-60	-180		
-159	-210		
-210	-27		
-27	-229		
-229	-25		
J18-25	J18-182	11	FIND NO. 13

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	126	WHT	22	12	144	
	146				105	
	104				145	
	143	WHT		12	88	
	87	BLK		11	140	
	142	WHT		12	86	
	85				147	
	148				84	
	83				149	
	150	WHT		12	82	
	81	BLK		11	139	
	151	WHT		12	80	
	79				158	
	157				78	
	77				156	
	155				76	
	75				154	
	166				67	
	66				167	
	178				65	
	64				173	
	176				42	
	41				177	
	180				39	
	38	WHT		12	179	
	137	BLK		11	37	
	31	WHT		12	153	
	152	WHT		12	30	
	29	BLK		11	141	
	159	WHT		12	28	
	27				160	
	161				26	
	25				162	
	163				24	
	23				164	
	165				22	
	21	WHT		12	172	
	136	BLK		11	20	
	19	WHT		12	171	
	170				18	
	17				169	
	168				16	
	15	WHT		12	174	
ATTACH FIND NO.11 LG3.0	138	SHLD			14	ATTACH FIND NO.11 LG 6.0
	13	WHT		12	175	
	125	WHT		12	211	
	186	BLK		11	124	
	123	WHT		12	219	
	223	WHT		12	122	
	121	BLK		11	182	
	212	WHT		12	119	
	118	BLK		11	185	
	198	WHT		12	115	
	113				197	
	199				110	
	109	WHT		12	204	
	181	BLK		11	108	
	106	WHT		12	205	
	221				101	
	99				206	
	207				98	
	97				208	
	209				96	
	95				210	
	215				94	
	93				214	
	213				92	
	74	WHT	22	12	220	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	224	WHT	22	12	72	
	71				193	
	190				70	
	63				218	
	194				40	
	36				187	
	202				35	
	34	WHT		12	201	
ATTACH FIND NO.11 LG 3.0	183	SHLD			33	ATTACH FIND NO.11 LG 3.8
	32	WHT		12	200	
	192	WHT		12	11	
	10	WHT		12	189	
	184	BLK		11	9	
	8	WHT		12	191	
	217				7	
	6				216	
	127				239	
	233				120	
	117				232	
	238				116	
	114				260	
	268				112	
	111				267	
	235				107	
	103	WHT		12	259	
	228	BLK		11	102	
	100	WHT		12	258	
	265				91	
	90				234	
	257				89	
	73				266	
	231	WHT		12	69	
	68	BLK		11	230	
	249	WHT		12	62	
	61	BLK		11	225	
	248	WHT		12	60	
	59	WHT		12	247	
ATTACH FIND NO.11 LG3.0	227	SHLD			58	ATTACH FIND NO.11 LG 4.9
	57	WHT		12	246	
	245	WHT		12	56	
	55	WHT		12	244	
	229	BLK		11	54	
	53	WHT		12	243	
	250				52	
	51				251	
	252	WHT		12	50	
	49	BLK		11	226	
	253	WHT		12	48	
	47				254	
	255				46	
	45				256	
	242				44	
	43				261	
	237				12	
	5				264	
	263				4	
	3				262	
	241				2	
	1				240	
	128				188	
	195				129	
	130				196	
	203				131	
	132				222	
	236				133	
	134				269	
	270	WHT	22	12	135	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/14/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1019934	1019965

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.2 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO
LEXINGTON, MASS
CONTRACT NO. NAS 9-458
DRAWN R.D. [illegible] DATE 3 JAN 64
CHECKED A. [illegible] 28 JAN 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2-10-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. ——— SIZE J NASA DRAWING NO. 1020116
SCALE NONE WT SHEET 3 OF 3

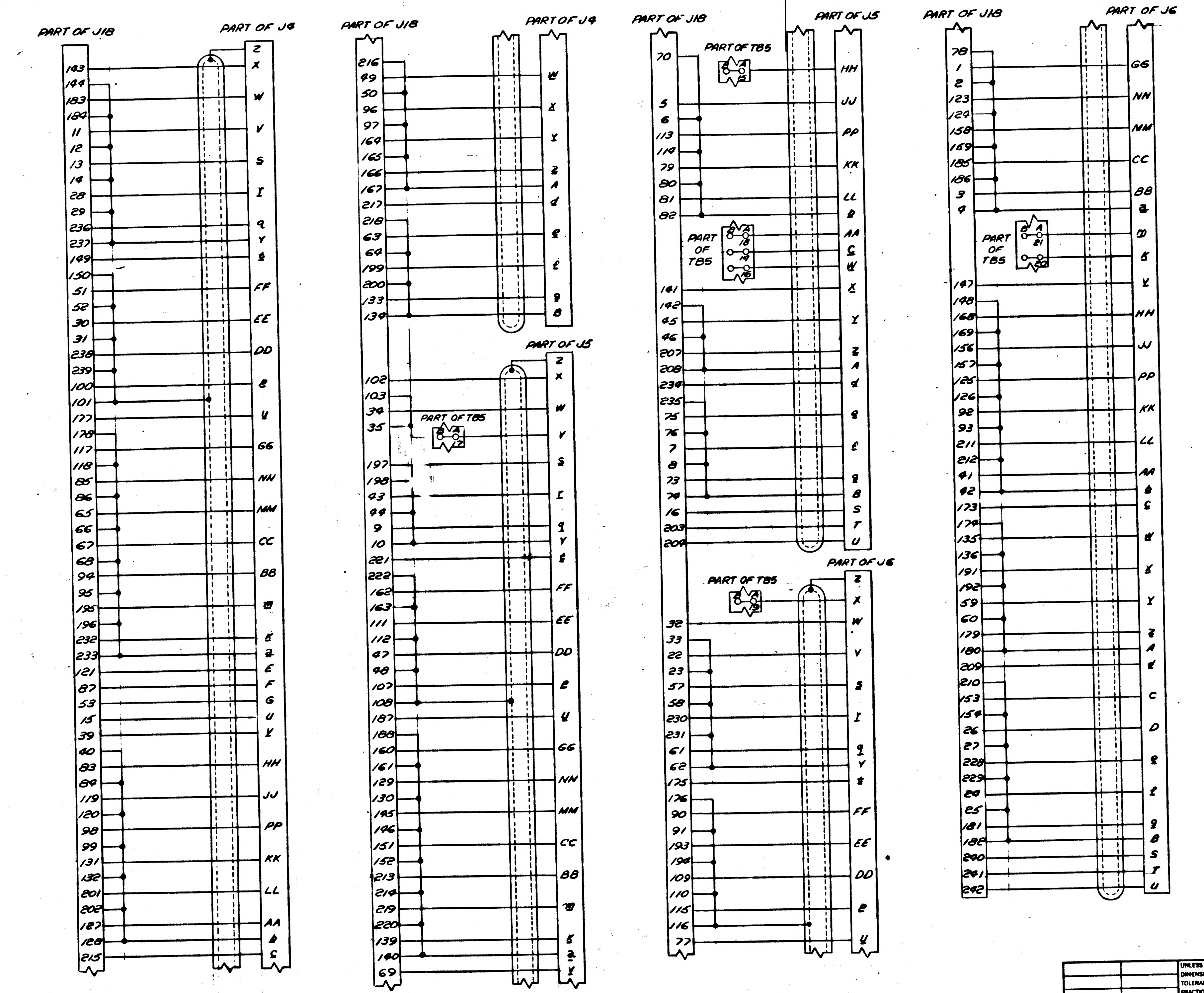
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR 0[illegible]	2-[illegible]-64	



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2-11-64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1020116	1014934
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.D.G[illegible] DATE 15 JAN 64
CHECKED A. C[illegible] 25 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2/1/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

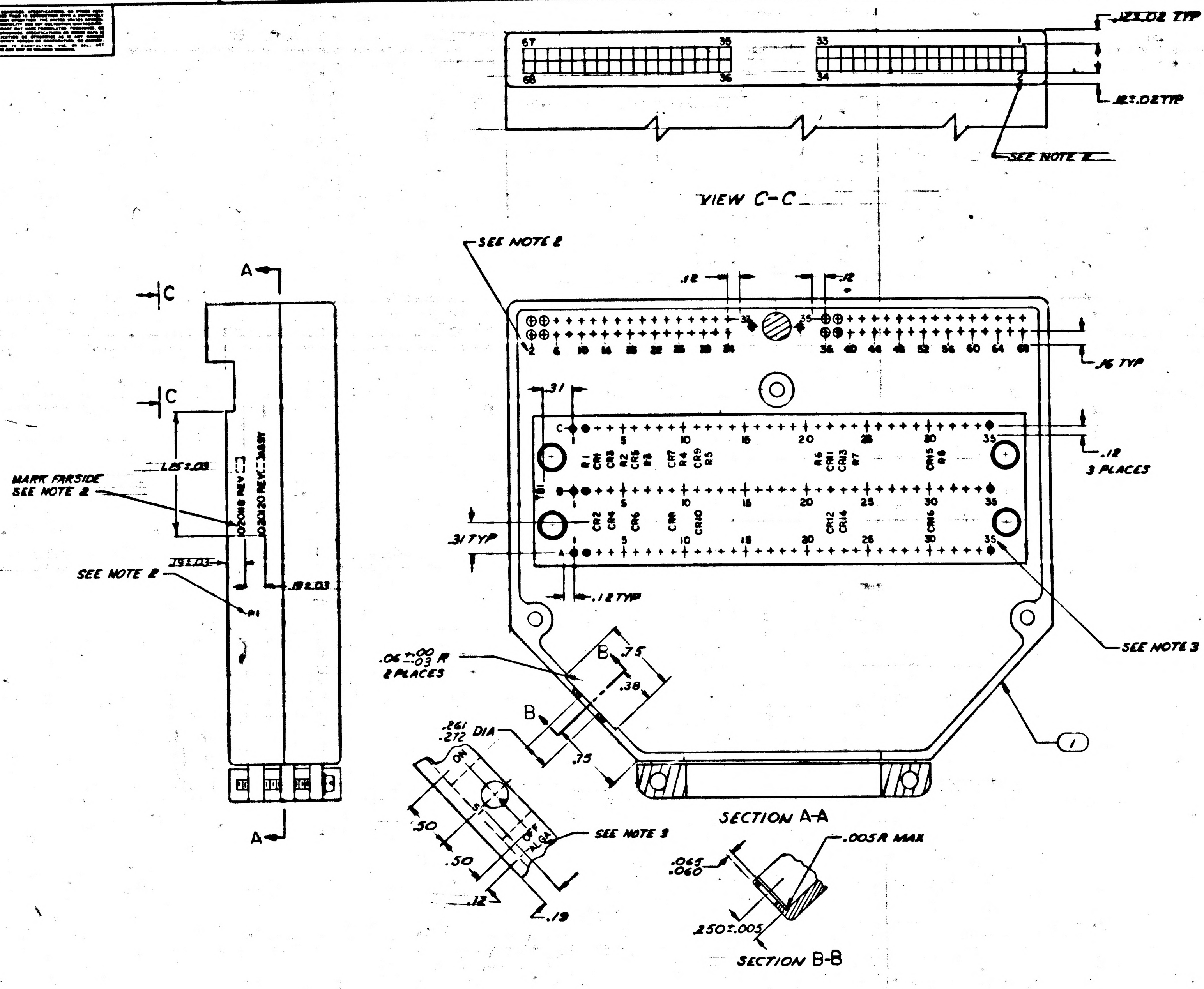
ELECTRICAL SCHEMATIC
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO.
SIZE F
NASA DRAWING NO. 1020117
SCALE NONE
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1
PHOTOGRAPHIC SCALE ONLY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06036		
A	CHANGED PER TDRR NO. 08027 DR S.T. CHK APPD	11 MAY 64	



.125±.02 TYP
67
35
33
1
68
36
34
2
.125±.02 TYP
SEE NOTE 2
VIEW C-C
SEE NOTE 2
.12
.12
37
35
2 6 10 14 18 22 26 30 34
36 40 44 48 52 56 60 64 68
.16 TYP
.31
C
1 5 10 15 20 25 30 35
.12
3 PLACES
R1 CR1 CR3 R2 CR5 R3 CR7 R4 CR9 R5
R6 CR11 CR13 R7 CR15 R8
TB1
B
1 5 10 15 20 25 30 35
CR2 CR4 CR6 CR8 CR10 CR12 CR14 CR16
.31 TYP
A
1 5 10 15 20 25 30 35
.12 TYP
SEE NOTE 3
.06 +.00 −.03 R
2 PLACES
B
.75
.38
.261
.272 DIA
B
.75
1
SECTION A-A
A
C
C
1.25±.03
MARK FARSIDE
SEE NOTE 2
1020118 REV □
1020120 REV □ ASSY
.19±.03
.19±.03
SEE NOTE 2
P1
A
.50
.50
.12
.19
SEE NOTE 3
.065
.060
.005R MAX
.250±.005
SECTION B-B

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE

NOTES
1. MATL REWORK FIND NO. 1 AS SHOWN
2. MARK .08 HIGH WHITE CHARACTERS PER ND1002019
3. MARK .08 HIGH BLACK CHARACTERS PER ND1002019 (ON TERMINAL BOARD ONLY)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1006693-1	CONNECTOR ASSY, R H	1

LIST OF MATERIALS

NEXT ASSY	USED ON
	1020102
1020120	1020115

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. 9-498
DRAWN DATE
CHECKED 15 JAN 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 29 Jan 64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR ASSEMBLY
R H REWORK

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020118
SCALE 2/1
WT
SHEET 1 OF 1

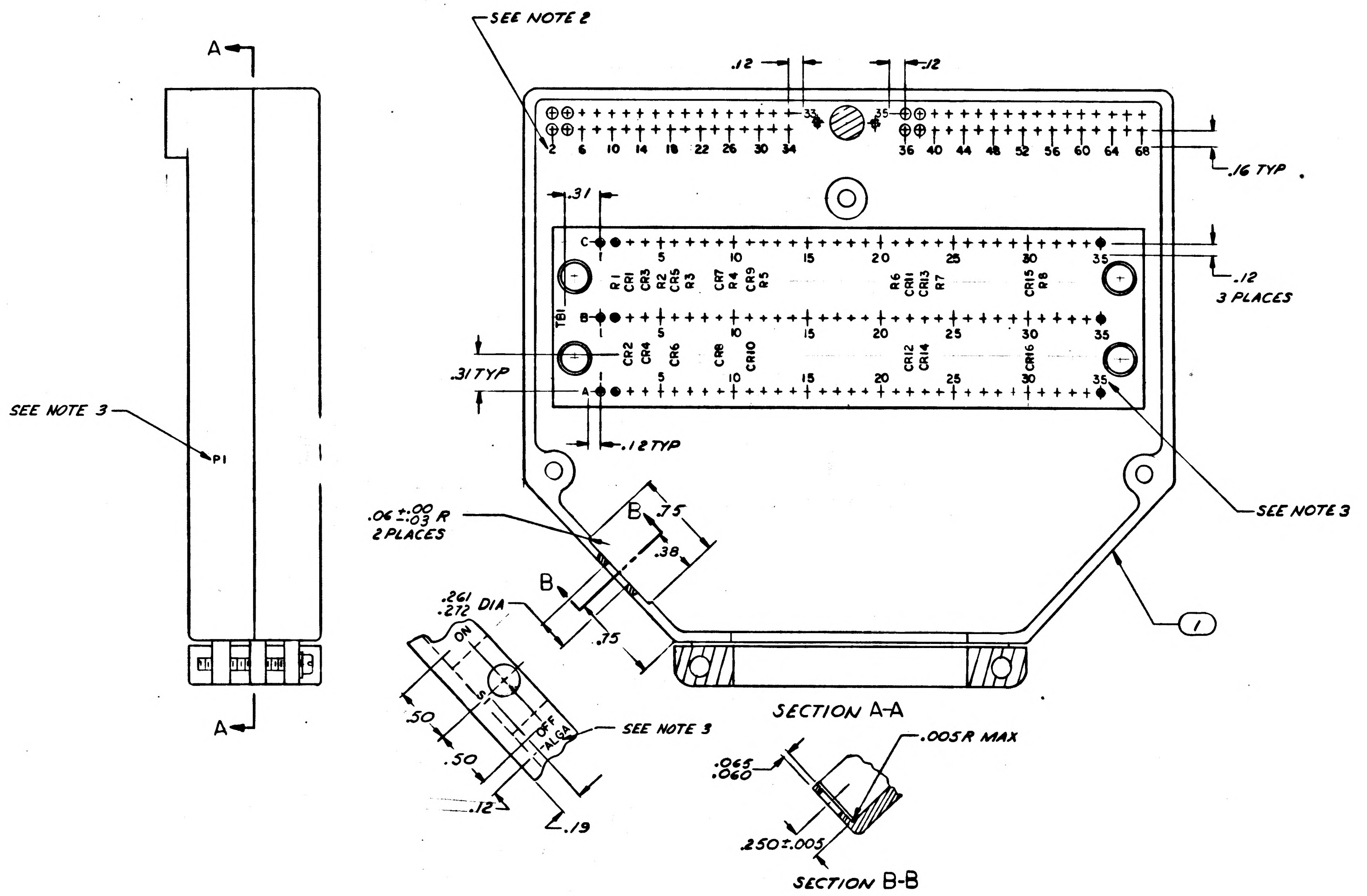
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 06036		



A
A
SEE NOTE 3
P1
SEE NOTE 2
.12
.12
33
35
2
6
10
14
18
22
26
30
34
36
40
44
48
52
56
60
64
68
.16 TYP
.31
C
B
A
TB1
1
5
10
15
20
25
30
35
R1
CR1
CR3
R2
CR5
R3
CR7
R4
CR9
R5
R6
CR11
CR13
R7
CR15
R8
CR2
CR4
CR6
CR8
CR10
CR12
CR14
CR16
.12
3 PLACES
.31 TYP
.12 TYP
SEE NOTE 3
.06 +.00 −.03 R
2 PLACES
B
.75
.38
B
.261 .272 DIA
.75
ON
S
OFF
ALGA
SEE NOTE 3
.50
.50
.12
.19
1
SECTION A-A
.005R MAX
.065 .060
.250±.005
SECTION B-B

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

NOTES
1. MATL REWORK FIND NO. 1 AS SHOWN
2. MARK .06 HIGH WHITE CHARACTERS PER ND1002019
3. MARK .06 HIGH BLACK CHARACTERS PER ND1002019 (ON TERMINAL BOARD ONLY)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1006693-1	CONNECTOR ASSY, R H	1

LIST OF MATERIALS

NEXT ASSY	USED ON
	1020102
1020120	1020115

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 8 JAN 64
CHECKED 15 JAN 64
APPROVAL H.W. Morse 20 JAN 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 29 Jan 64
MIT APPROVAL 1-28-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

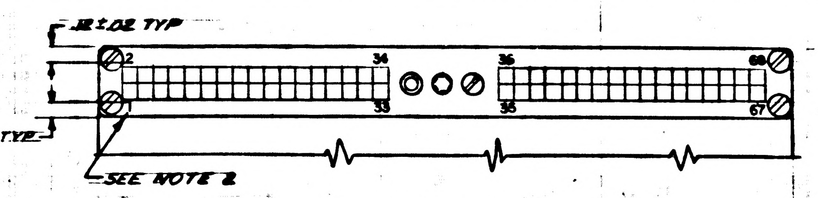
CONNECTOR ASSEMBLY
R H REWORK

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020118
SCALE 2/1
WT
SHEET 1 OF 1

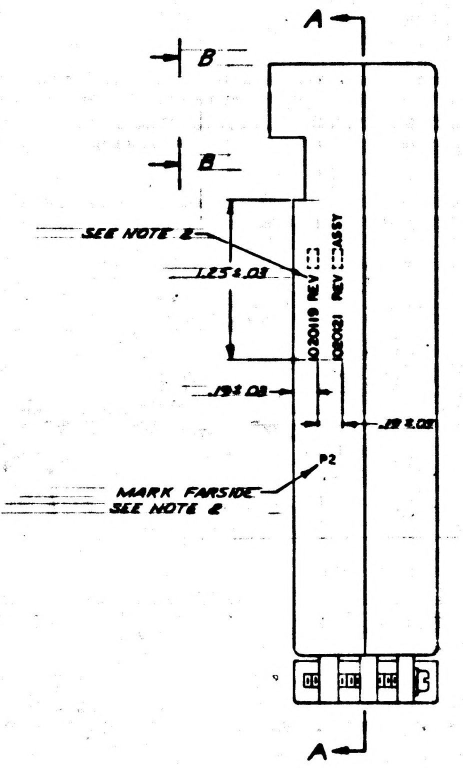
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

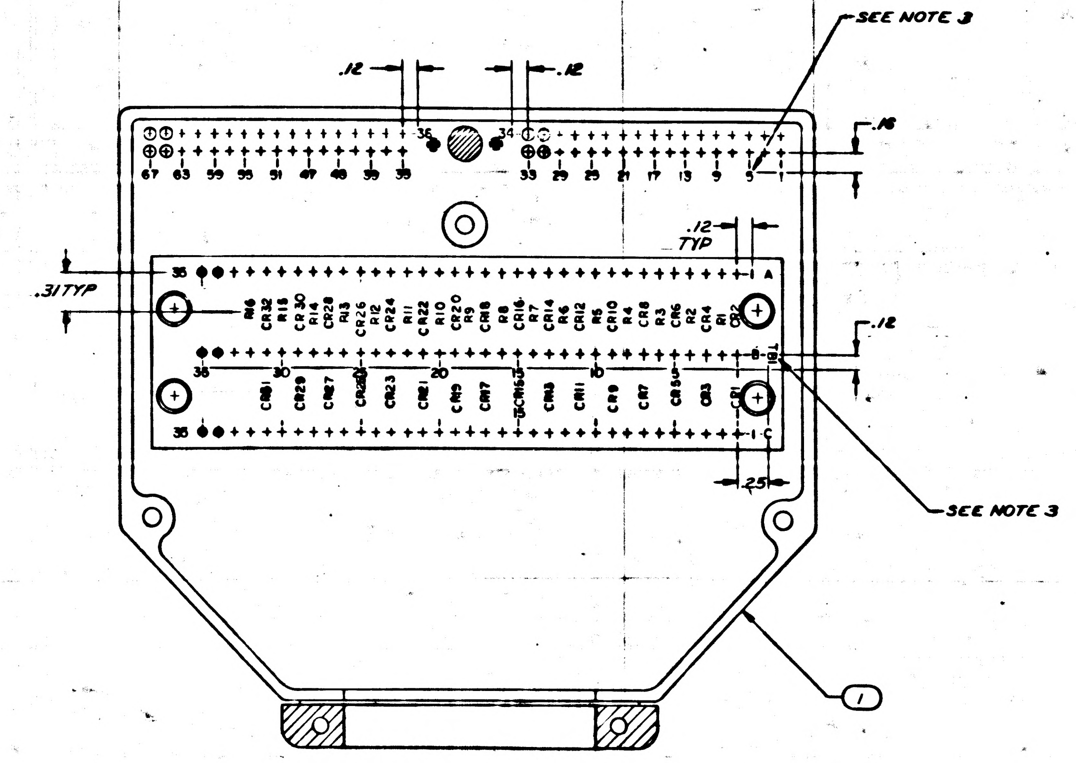
1020118

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR [illegible]		
A	CHANGED PER TDRR NO. 08027 DR [illegible] CHKR [illegible] APPD [illegible]	MAY 64	NCB


.12 ±.02 TYP
2
34
36
68
1
33
35
67
.12 ±.02 TYP
SEE NOTE 2

VIEW B-B


A
B
B
SEE NOTE 2
1.25 ±.03
1020119 REV
1020121 REV ASSY
.19 ±.03
.19 ±.03
P2
MARK FARSIDE
SEE NOTE 2
A


.12
.12
SEE NOTE 3
.16
35
34
67
63
59
55
51
47
43
39
35
33
29
25
21
17
13
9
5
1
.12 TYP
.31 TYP
36
A
R16
CR32
R15
CR30
R14
CR28
R13
CR26
R12
CR24
R11
CR22
R10
CR20
R9
CR18
R8
CR16
R7
CR14
R6
CR12
R5
CR10
R4
CR8
R3
CR6
R2
CR4
R1
CR2
.12
36
30
20
10
B
CR31
CR29
CR27
CR25
CR23
CR21
CR19
CR17
CR15
CR13
CR11
CR9
CR7
CR5
CR3
CR1
C
35
.25
SEE NOTE 3
1

SECTION A-A

NOTES:

1. MAT'L: REWORK FIND NO. 1 AS SHOWN
2. MARK .08 HIGH WHITE CHARACTERS PER ND1002019
3. MARK .08 HIGH BLACK CHARACTERS PER ND1002019 (ON TERMINAL BOARD ONLY)

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE [illegible]

MASTER

1	1006693-2	CONNECTOR ASSY, LH	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

	1020102
1020121	1020115
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 1
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 9 JAN 64
CHECKED [illegible] 15 JAN 64
APPROVAL [illegible] 20 JAN 64
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 24 Jan 64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR ASSEMBLY
L H REWORK

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020119
SCALE 2/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

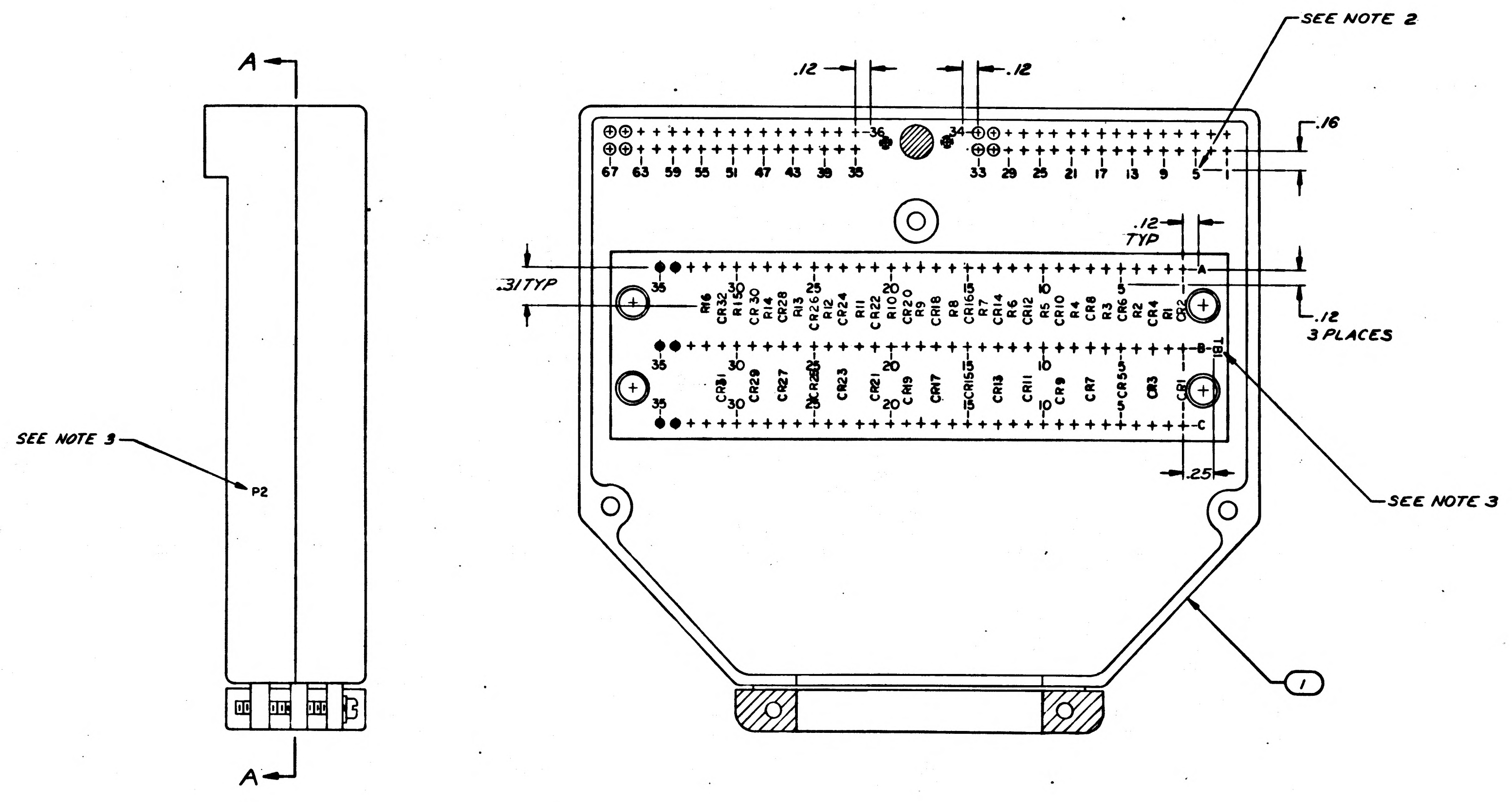
1020119

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		


A
A
SEE NOTE 3
P2
.12
.12
SEE NOTE 2
.16
36
34
67 63 59 55 51 47 43 39 35
33 29 25 21 17 13 9 5 1
.12 TYP
.31 TYP
.12 3 PLACES
A
B
C
35
30
25
20
15
10
5
R16 CR32 R15 CR30 R14 CR28 R13 CR26 R12 CR24 R11 CR22 R10 CR20 R9 CR18 R8 CR16 R7 CR14 R6 CR12 R5 CR10 R4 CR8 R3 CR6 R2 CR4 R1 CR2
CR31 CR29 CR27 CR25 CR23 CR21 CR19 CR17 CR15 CR13 CR11 CR9 CR7 CR5 CR3 CR1
TB1
.25
SEE NOTE 3
1

SECTION A-A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

NOTES:
1. MAT'L: REWORK FIND NO. 1 AS SHOWN
2. MARK .06 HIGH WHITE CHARACTERS PER ND100219
3. MARK .06 HIGH BLACK CHARACTERS PER ND100219 (ON TERMINAL BOARD ONLY)

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	1006693-2	CONNECTOR ASSY, LH	1

LIST OF MATERIALS

NEXT ASSY	USED ON
	1020102
1020121	1020115

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 1
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R. C. Tucker DATE 7 JAN 64
CHECKED J. Walbourg 15 Jan 64
APPROVAL H. W. Moore JPR 20 JAN 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL W. Kupfer 29 Jan 64
MIT APPROVAL 1-28-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

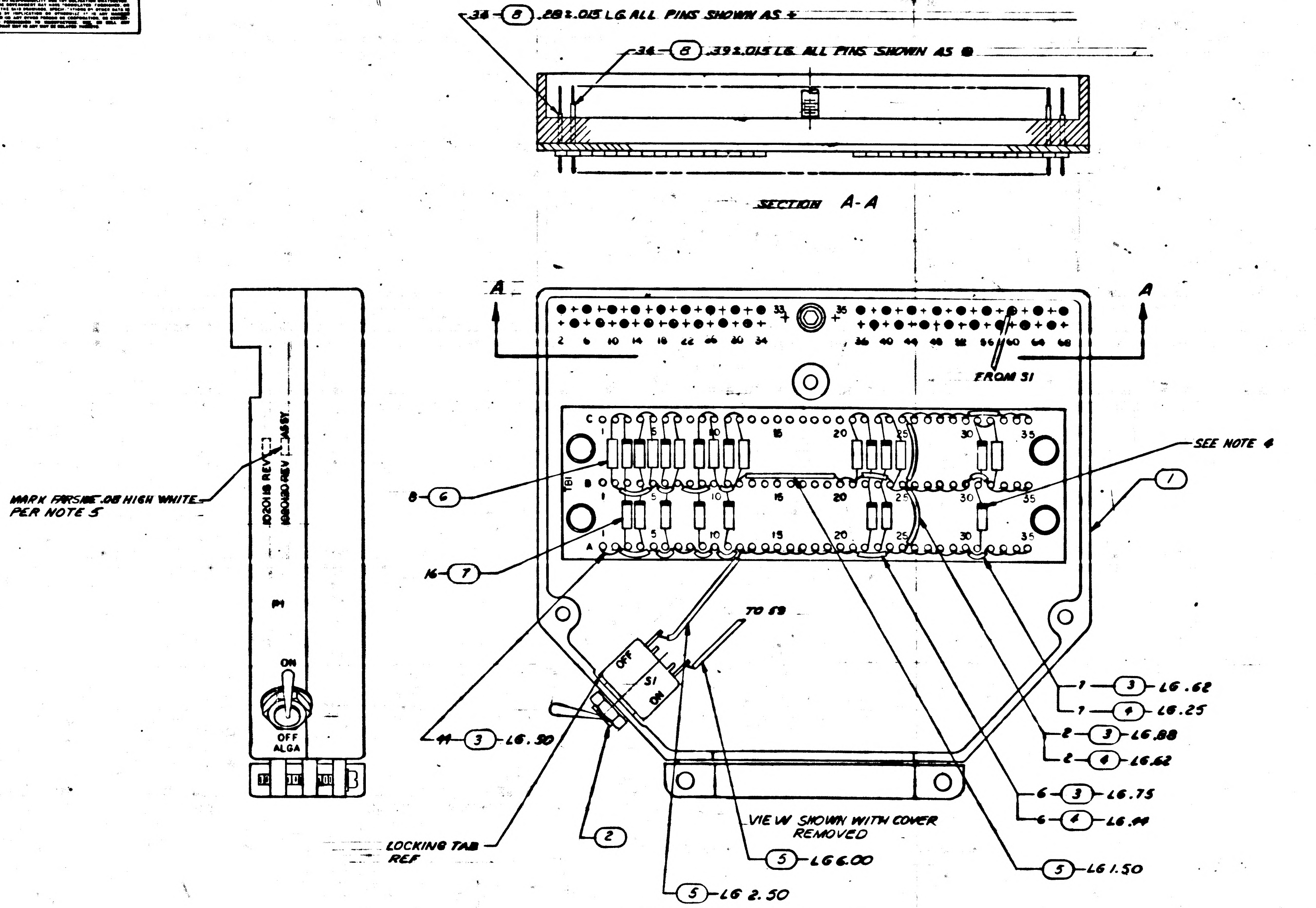
CONNECTOR ASSEMBLY
L H REWORK

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020119
SCALE 2/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020119

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06086		
A	CHANGED PER TDRR08027 DR ST. Aufie CHK R. Heinden APPD	11 MAY 64	KE


34 - 8 .28±.015 LG ALL PINS SHOWN AS +
34 - 8 .39±.015 LG ALL PINS SHOWN AS ●
SECTION A-A
A
A
33
35
2 6 10 14 18 22 26 30 34
36 40 44 48 52 56 60 64 68
FROM S1
C
TB1
B
A
1 5 10 15 20 25 30 35
SEE NOTE 4
1
8 - 6
16 - 7
MARK P/N & REV .08 HIGH WHITE PER NOTE 5
1020118 REV
1020120 REV ASSY
P1
ON
OFF
ALGA
OFF
S1
ON
TO 69
11 - 3 - LG .50
LOCKING TAB REF
2
VIEW SHOWN WITH COVER REMOVED
5 - LG 6.00
5 - LG 2.50
7 - 3 - LG .62
7 - 4 - LG .25
2 - 3 - LG .88
2 - 4 - LG .62
6 - 3 - LG .75
6 - 4 - LG .44
5 - LG 1.50

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06086 DATE 1/21/64

JUMPER LIST			
FROM TB1	TO PIN	LENGTH	FIND NO.
C3	12	2.00	5
C4	14	2.00	↑
C6	15	2.12	
C9	23	2.12	
C11	27	2.12	
C22	36	2.00	
C23	38	2.00	
C25	65	2.75	
C31	53	2.12	
C25	66	2.75	
B35	67	2.75	↓
C35	69	2.00	5

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. SOLDER PER MIL-S-6872
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. DESIGNATES CATHODE END
5. MARK APPLICABLE REV NO. PER ND 1002019
6. MIL-I-631 TYPE F, FORM U2 GRADE 2, CLASS I, CATEGORY I SIZE NO. 22 AWG FOR FIND NO. 5

☒	1020123	SCHEMATIC	REF
* 2.1	MIL-I-18057, NO. 22 WHITE	TUBING, RUBBER, SILICONE	8
16	1006751	DIODE	7
8	1006750-16	RESISTOR, FIXED	6
* 3.0	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	5
* .5	SEE NOTE 6	SLEEVING	4
* 2.7	QQ-W-341 #22 AWG	WIRE, ELECTRICAL	3
1	MS24655-22	SWITCH, MINIATURE	2
1	1020118	CONNECTOR ASSY, RH	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

* INDICATES LENGTH IN FEET

1020115	1014156
1020102	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
DRAWN DATE 9 JAN 64
CHECKED 15 JAN 64
APPROVAL 20 JAN 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONNECTOR
ASSEMBLY R H

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020120
SCALE 2/1
WT
SHEET 1 OF 1

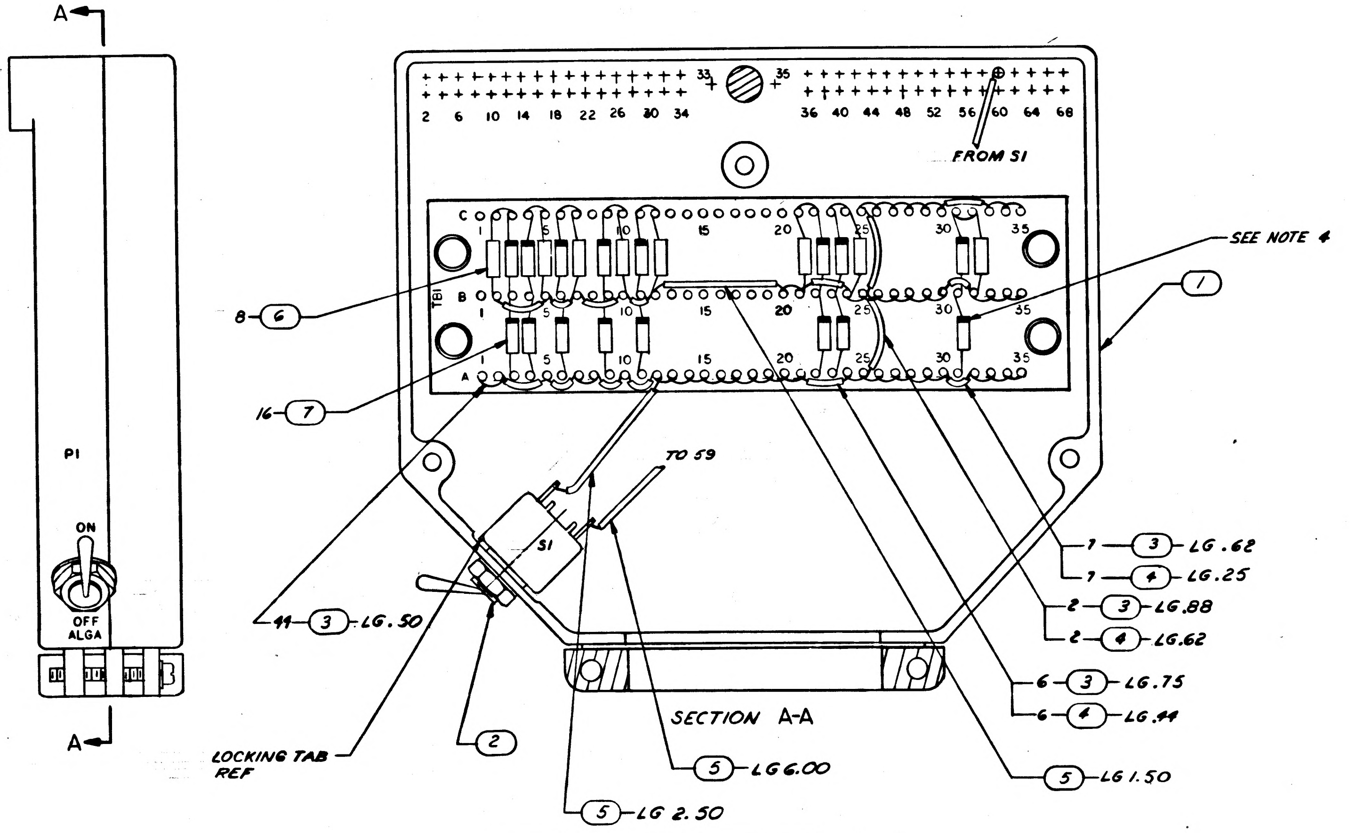
MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06036		



FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/21/64

JUMPER LIST

FROM TB1	TO PIN	LENGTH	FIND NO.
C3	12	2.00	5
C4	14	2.00	↑
C6	15	2.12	
C9	23	2.12	
C11	27	2.12	
C22	36	2.00	
C23	38	2.00	
C25	65	2.75	
C31	53	2.12	
C25	66	2.75	↓
B35	67	2.75	
C35	68	2.00	5

NOTES
1. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
2. SOLDER PER MIL-S-6872
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. DESIGNATES ANODE END

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020123	SCHEMATIC	REF
	16	1006751	DIODE	7
	8	1006750-16	RESISTOR, FIXED	6
✱	30	MIL-W-16878/4, E22 WHT	WIRE, ELECTRICAL	5
✱	.5	MIL-I-631 TYPE F #22 AWG FORM U/A	SLEEVING	4
✱	27	QQ-W-341 #22 AWG	WIRE, ELECTRICAL	3
	1	MS24655-22	SWITCH, MINIATURE	2
	1	1020118	CONNECTOR ASSY, RH	1

LIST OF MATERIALS

✱ INDICATES LENGTH IN FEET

NEXT ASSY	USED ON
1020115	1014156
1020102	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.06 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 9 JAN 64
CHECKED 15 JAN 64
APPROVAL 20 JAN 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 29 Jan 64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONNECTOR
ASSEMBLY R H

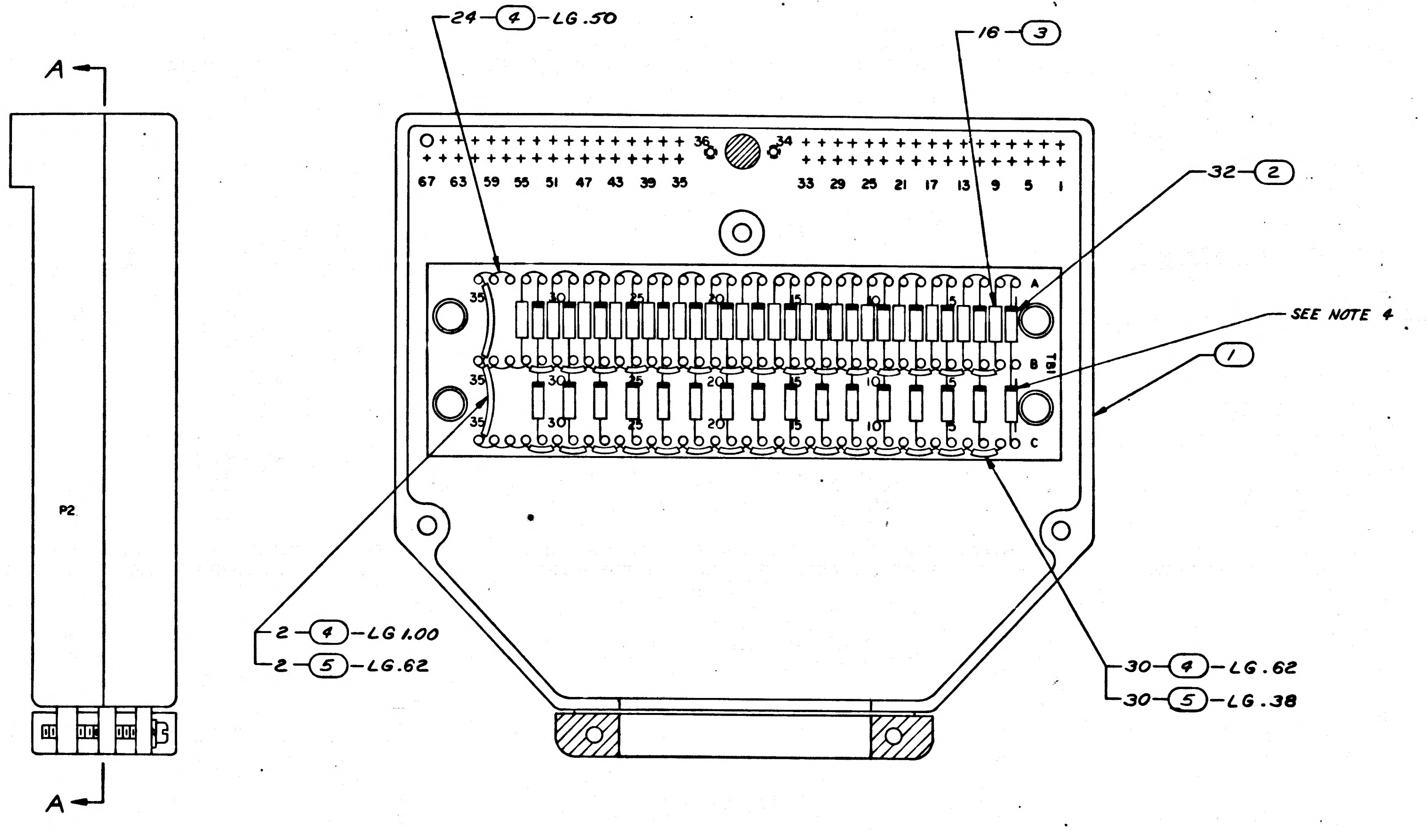
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020120
SCALE 2/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06036		



SECTION A-A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06036 DATE 1/29/64

NOTES:
1. FOR SYMBOLS FABRICATION & REQUIRED TESTS SEE ND 1002032
2. SOLDER PER MIL-S-6872
3. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
4. DESIGNATES ANODE END

JUMPER LIST			
FROM TB1	TO PIN	LENGTH	FIND NO.
A1	2	2.12	6
A3	1	2.12	↑
A5	3	2.19	
A7	4	2.50	
A9	5	2.44	
A11	6	2.62	
A13	7	2.75	
A15	8	3.00	
A17	9	3.12	
A19	10	3.38	
A21	11	3.38	
A23	12	3.69	
A25	13	3.75	
A27	14	4.00	
A29	15	4.12	
A31	16	4.38	
A33	65	2.12	
A34	66	2.19	
	67	2.12	↓
A35	68	2.19	6

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020122	SCHEMATIC	REF
*	4.8	MIL-W-16878/4 E22 WHT	WIRE, ELECTRICAL	6
*	1.1	MIL-I-631 TYPE F #22 AWG FORM U/A	SLEEVING	5
*	2.5	QQ-W-341 #22 AWG	WIRE, ELECTRICAL	4
	16	1006750-16	RESISTOR, FIXED	3
	32	1006751	DIODE	2
	1	1020119	CONNECTOR ASSY, L.H.	1

LIST OF MATERIALS

* INDICATES LENGTH IN FEET

1020102	1014465	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ±.06 ANGLES ± DO NOT SCALE THIS DRAWING	RAYTHEON CO. LEXINGTON, MASS. CONTRACT NO. NAS 9-498	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
1020115	1014156	MATERIAL	DRAWN DATE CHECKED APPROVAL APPROVAL APPROVAL	TEST CONNECTOR ASSEMBLY L H
NEXT ASSY	USED ON	HEAT TREATMENT	NASA APPROVAL MIT APPROVAL MIT APPROVAL	CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020121
APPLICATION		FINAL FINISH		SCALE 2/1 WT SHEET 1 OF 1

1020121

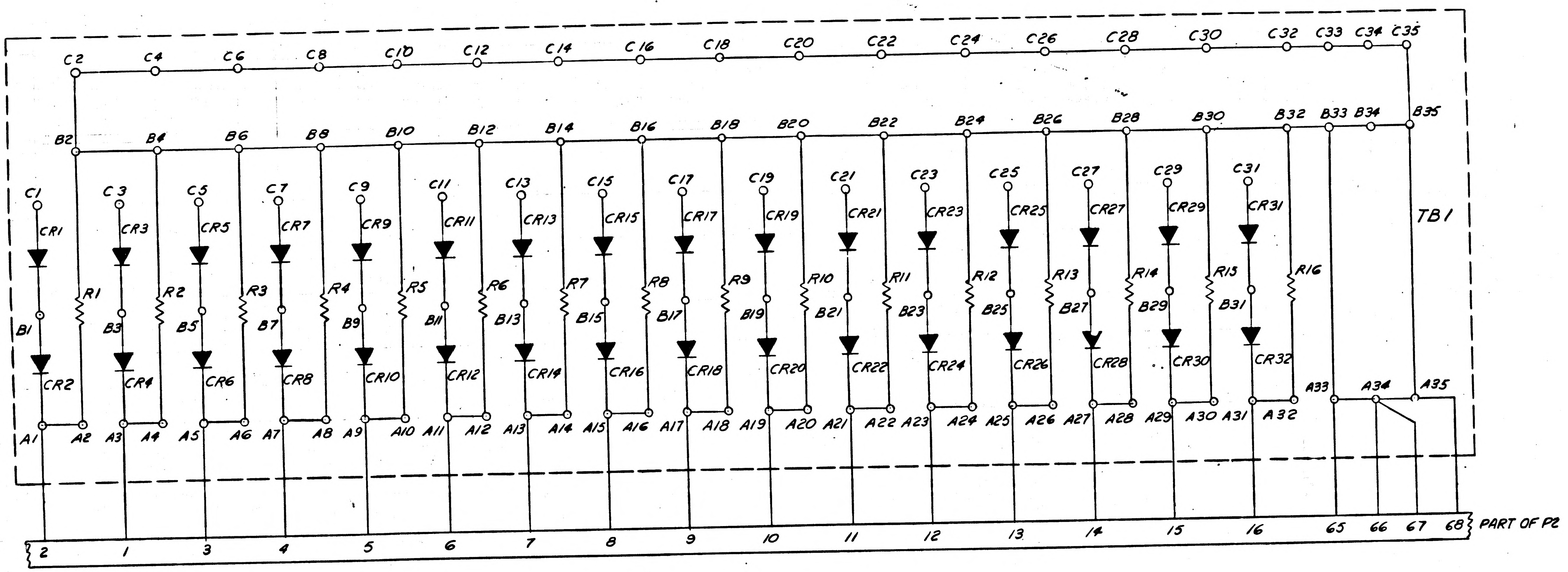
MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 06318	2/11/64	


C2 C4 C6 C8 C10 C12 C14 C16 C18 C20 C22 C24 C26 C28 C30 C32 C33 C34 C35
B2 B4 B6 B8 B10 B12 B14 B16 B18 B20 B22 B24 B26 B28 B30 B32 B33 B34 B35
C1 C3 C5 C7 C9 C11 C13 C15 C17 C19 C21 C23 C25 C27 C29 C31
CR1 CR3 CR5 CR7 CR9 CR11 CR13 CR15 CR17 CR19 CR21 CR23 CR25 CR27 CR29 CR31
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16
TB1
B1 B3 B5 B7 B9 B11 B13 B15 B17 B19 B21 B23 B25 B27 B29 B31
CR2 CR4 CR6 CR8 CR10 CR12 CR14 CR16 CR18 CR20 CR22 CR24 CR26 CR28 CR30 CR32
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27 A28 A29 A30 A31 A32 A33 A34 A35
2 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 65 66 67 68
PART OF P2

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2-11-64

NOTES
1. ALL RESISTORS TO BE 220Ω ± 5% 1/4W
2. ALL DIODES TO BE 1006751

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1020121	1020102

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 9 JAN 64
CHECKED J Wattoney 15 JAN 64
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 2-11-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
TEST CONNECTOR LH
AGC/CTS OPERATION CONSOLE

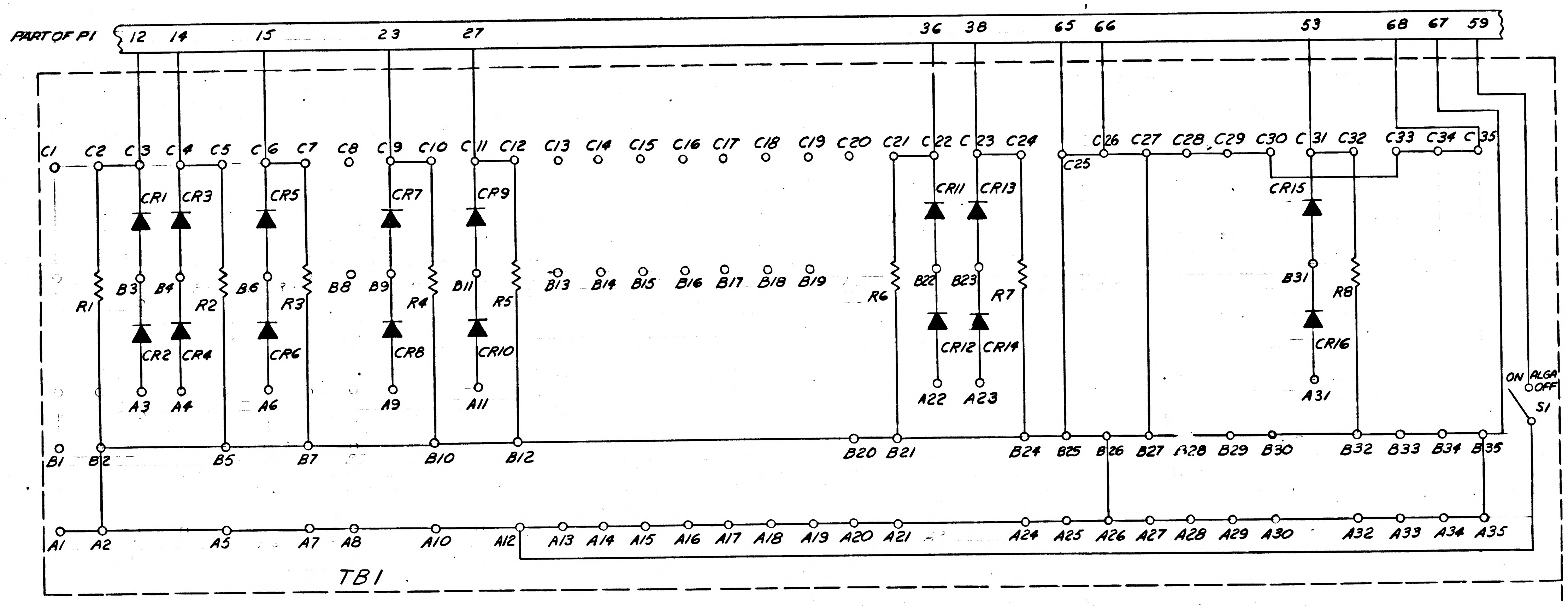
CODE IDENT NO. —
SIZE D
NASA DRAWING NO 1020122
SCALE NONE
WT
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CL B RELEASED PER TDRR 06318	2-11-64	


PART OF P1
12 14 15 23 27 36 38 65 66 53 68 67 59
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35
CR1 CR3 CR5 CR7 CR9 CR11 CR13 CR15
B3 B4 B6 B8 B9 B11 B13 B14 B15 B16 B17 B18 B19 B22 B23 B31
R1 R2 R3 R4 R5 R6 R7 R8
CR2 CR4 CR6 CR8 CR10 CR12 CR14 CR16
A3 A4 A6 A9 A11 A22 A23 A31
ON ALGA OFF
S1
B1 B2 B5 B7 B10 B12 B20 B21 B24 B25 B26 B27 B28 B29 B30 B32 B33 B34 B35
A1 A2 A5 A7 A8 A10 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A24 A25 A26 A27 A28 A29 A30 A32 A33 A34 A35
TB1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06318 DATE 2/11/64

NOTES
1. ALL RESISTORS TO BE 220Ω ± 5% 1/4W
2. ALL DIODES TO BE 1006751

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1020120	1020102

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-496
DRAWN G. Gustone DATE 9 JAN 64
CHECKED J. Wolkoney 15 JAN 64
APPROVAL C. Spadimy 1 Dk
APPROVAL
APPROVAL
NASA APPROVAL W. J. Rhine 2-11-64
MIT APPROVAL W. Geffer 11 Feb 64
MIT APPROVAL D. Seckomi 2-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
TEST CONNECTOR RH
AGC/CTS OPERATION CONSOLE

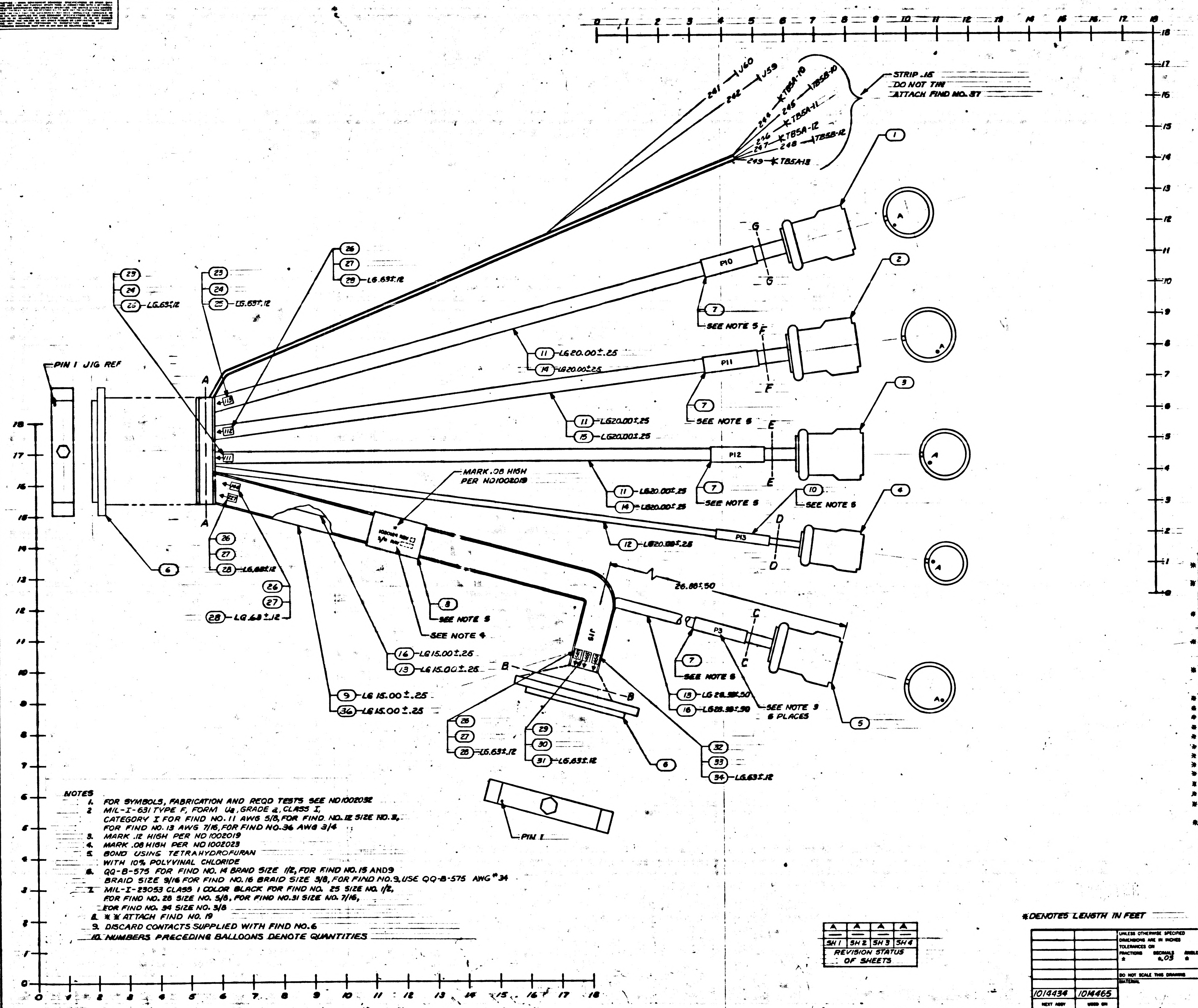
CODE IDENT NO. —
SIZE D
NASA DRAWING NO 1020123
SCALE NONE
WT
SHEET 1 OF 1

INCHES
1 2
PHOTOGRAPHIC SCALE ONLY

1050159

1020124

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR [illegible] CHK [illegible] APPD [illegible]	[illegible]	KG


241 J60
242 J59
244 TB5A-10
245 TB5B-10
246 TB5A-11
247 TB5A-12
248 TB5B-12
249 TB5A13
STRIP .15
DO NOT TIN
ATTACH FIND NO. 37
PIN 1 JIG REF
PIN 1
P10
P11
P12
P13
P3
G
F
E
D
C
B
A
MARK .08 HIGH
PER ND1002019
SEE NOTE 5
SEE NOTE 4
SEE NOTE 3
6 PLACES
26.88±.50
11 LG20.00±.25
14 LG20.00±.25
15 LG20.00±.25
12 LG20.00±.25
16 LG15.00±.25
13 LG15.00±.25
9 LG15.00±.25
36 LG15.00±.25
13 LG28.38±.50
16 LG28.38±.50
28 LG.63±.12
31 LG.63±.12
34 LG.63±.12
25 LG.63±.12
29 LG.63±.12
1
2
3
4
5
6
7
8
10

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-631 TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I FOR FIND NO. 11 AWG 5/8, FOR FIND NO. 12 SIZE NO. 3, FOR FIND NO. 13 AWG 7/16, FOR FIND NO. 36 AWG 3/4
3. MARK .12 HIGH PER ND 1002019
4. MARK .08 HIGH PER ND 1002023
5. BOND USING TETRAHYDROFURAN WITH 10% POLYVINAL CHLORIDE
6. QQ-B-575 FOR FIND NO. 14 BRAID SIZE 1/2, FOR FIND NO. 15 AND 9 BRAID SIZE 9/16 FOR FIND NO. 16 BRAID SIZE 3/8, FOR FIND NO. 9, USE QQ-B-575 AWG # 34
7. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 25 SIZE NO. 1/2, FOR FIND NO. 28 SIZE NO. 5/8, FOR FIND NO. 31 SIZE NO. 7/16, FOR FIND NO. 34 SIZE NO. 3/8
8. ✱✱ ATTACH FIND NO. 19
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 6
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06330 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1020126	ELECTRICAL SCHEMATIC	REF
6	MS25036-1	TERMINAL LUG	37
*2.0	SEE NOTE 2	SLEEVING	36
488	1010738-2	CONTACT, ELEC, SOCKET	35
*0.5	SEE NOTE 7	SLEEVING	34
2	1000242-29	FERRULE, ELEC CONDUCTOR	33
2	1000243-31	FERRULE, ELEC CONDUCTOR	32
*0.5	SEE NOTE 7	SLEEVING	31
2	1000242-30	FERRULE, ELEC CONDUCTOR	30
2	1000243-34	FERRULE, ELEC CONDUCTOR	29
*0.5	SEE NOTE 7	SLEEVING	28
4	1000242-34	FERRULE, ELEC CONDUCTOR	27
4	1000243-41	FERRULE, ELEC CONDUCTOR	26
*0.5	SEE NOTE 7	SLEEVING	25
4	1000242-33	FERRULE, ELEC CONDUCTOR	24
4	1000243-37	FERRULE, ELEC CONDUCTOR	23
*2.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHITE/RED	22
*2.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, ORANGE	21
*11.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BROWN	20
*17.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BLACK	19
*85.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHITE	18
*220.0	1014341-11	WIRE, ELEC	17
*4.0	SEE NOTE 6	BRAID, WIRE	16
*2.0	SEE NOTE 6	BRAID, WIRE	15
*4.0	SEE NOTE 6	BRAID, WIRE	14
*4.0	SEE NOTE 2	SLEEVING	13
*2.0	SEE NOTE 2	SLEEVING	12
*6.0	SEE NOTE 2	SLEEVING	11
1	1014472-1A	BAND MARKER, CABLE	10
*2.0	SEE NOTE 6	BRAID, WIRE	9
1	1014472-8	BAND MARKER, CABLE	8
4	1014472-3A	BAND MARKER, CABLE	7
2	1010642-2	CONNECTOR	6
1	MS3126F-22-55XS	CONNECTOR, PLUG	5
1	MS3126F-16-8P	CONNECTOR, PLUG	4
1	MS3126F-22-55S	CONNECTOR, PLUG	3
1	MS3126F-24-61WS	CONNECTOR, PLUG	2
1	MS3126F-22-55WS	CONNECTOR, PLUG	1

LIST OF MATERIALS

*DENOTES LENGTH IN FEET

A	A	A	A
SH 1	SH 2	SH 3	SH 4

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
1014434	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±

DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Cagle DATE 23 Jan 64
CHECKED A. Cagginus 23 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

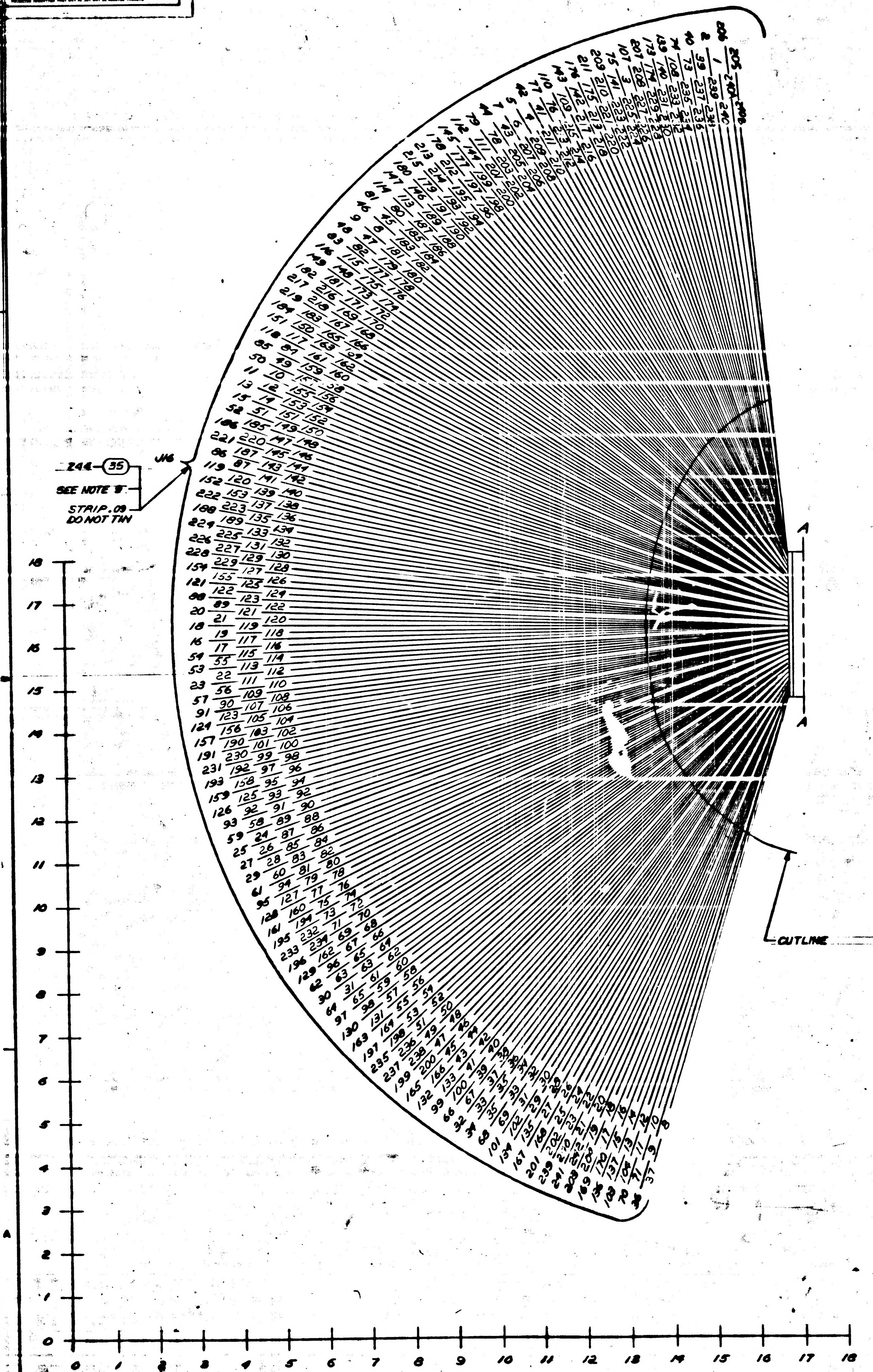
WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020124
SCALE 1/1 WT SHEET 1 OF 4

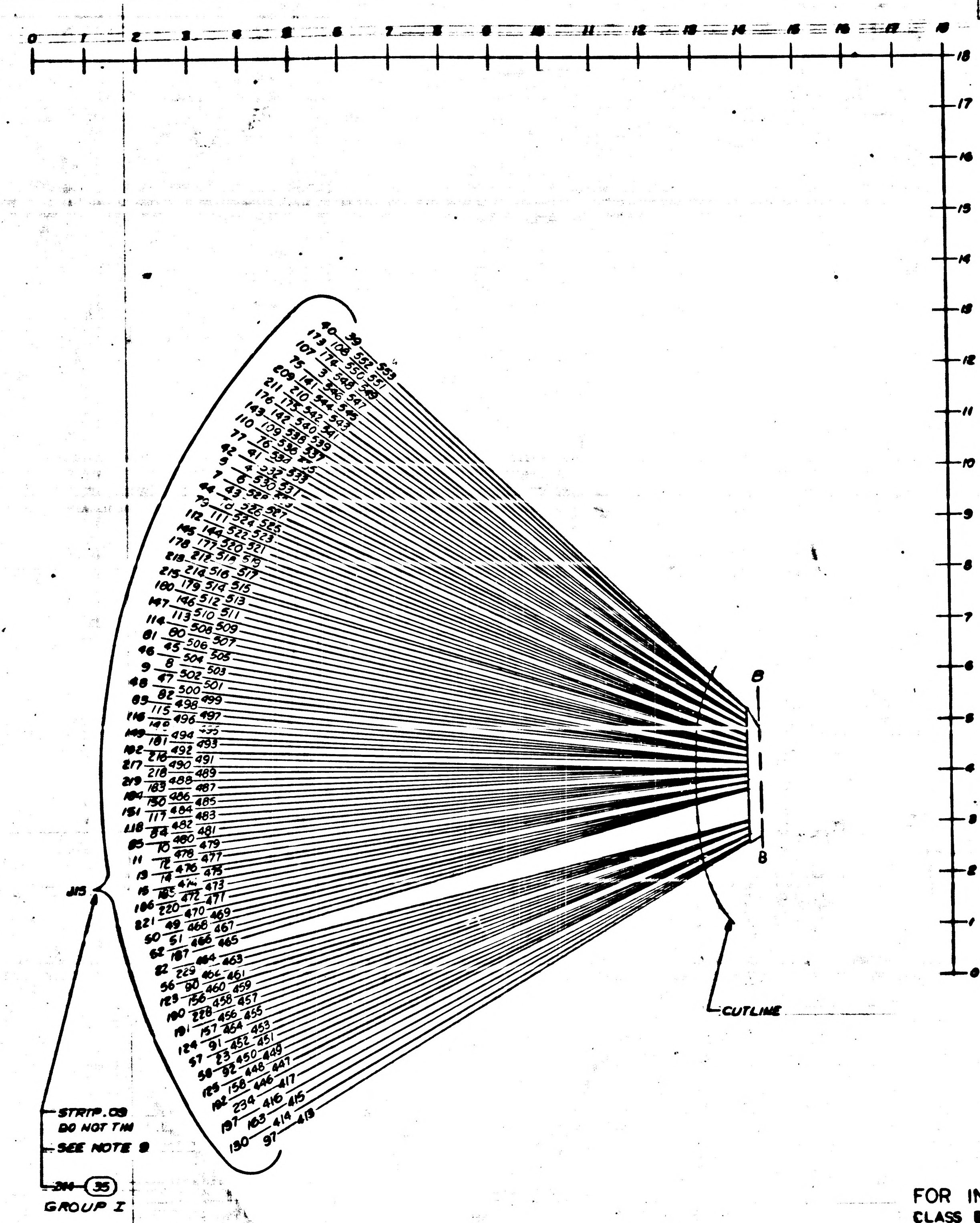
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020124

SYM	DESCRIPTION	DATE	APPR
REVISIONS			
—	~~CL B RELEASED PER TDRR~~		
A	CHANGED PER TDRR 07350 DR. [illegible] CHK [illegible] APPD [illegible]	[illegible]	K[illegible]



244-35
SEE NOTE 9
STRIP .09
DO NOT TWIST
J16
A
A
CUTLINE
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18



J15
STRIP .09
DO NOT TWIST
SEE NOTE 9
244-35
GROUP I
B
B
CUTLINE
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/14/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014494	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 24 Jan 64
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

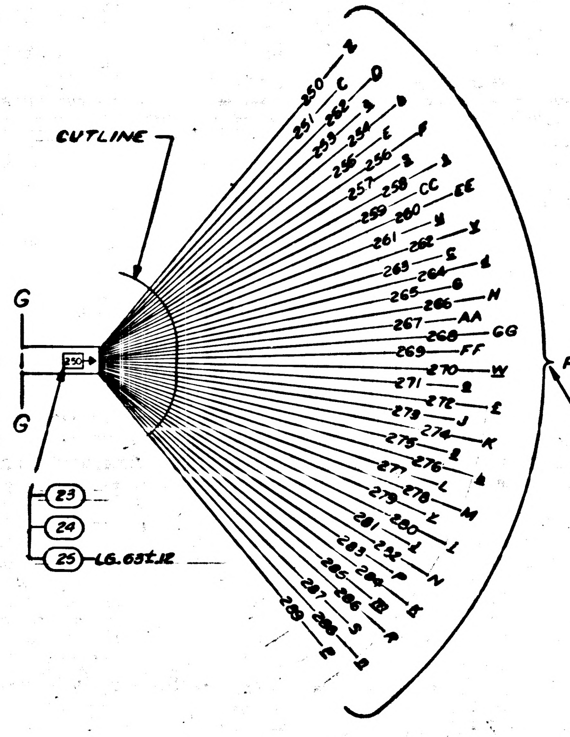
WIRING HARNESS, BRANCH D
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020124
SCALE 1/1
WT
SHEET

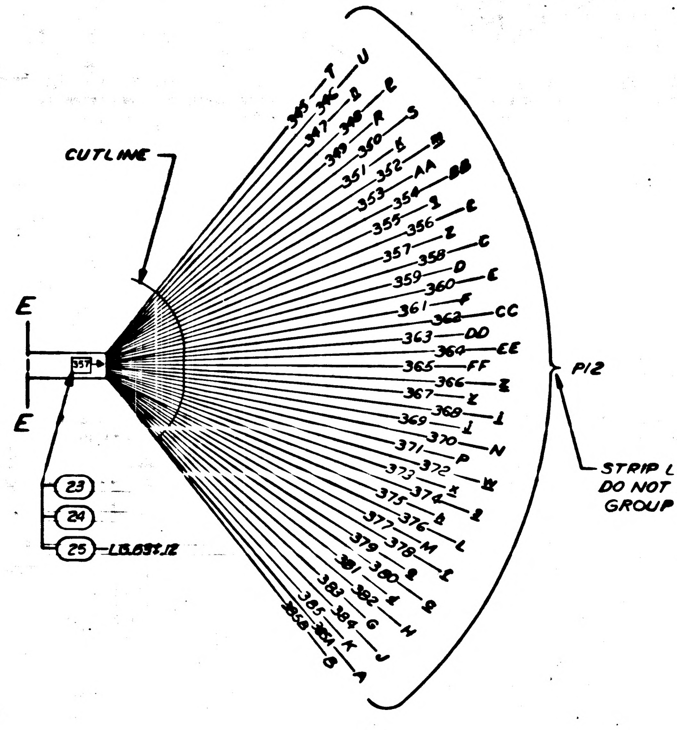
1020124

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

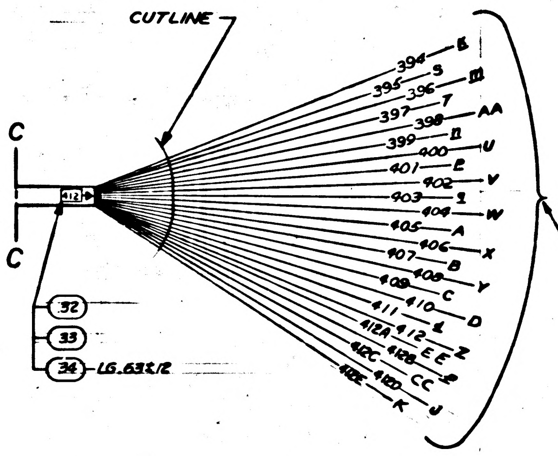
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. B.Kataki CHK Kong APPD	4/12/64	KB


CUTLINE
G
G
250
23
24
25
LG.63±.12
250
251 C
252 D
253
254
255 E
256 F
257
258
259
260
261
262
263
264
265 G
266 H
267 AA
268 GG
269 FF
270 W
271
272
273 J
274 K
275
276
277 L
278 M
279
280
281
282 N
283 P
284
285
286 R
287 S
288
289
CC
EE
P10

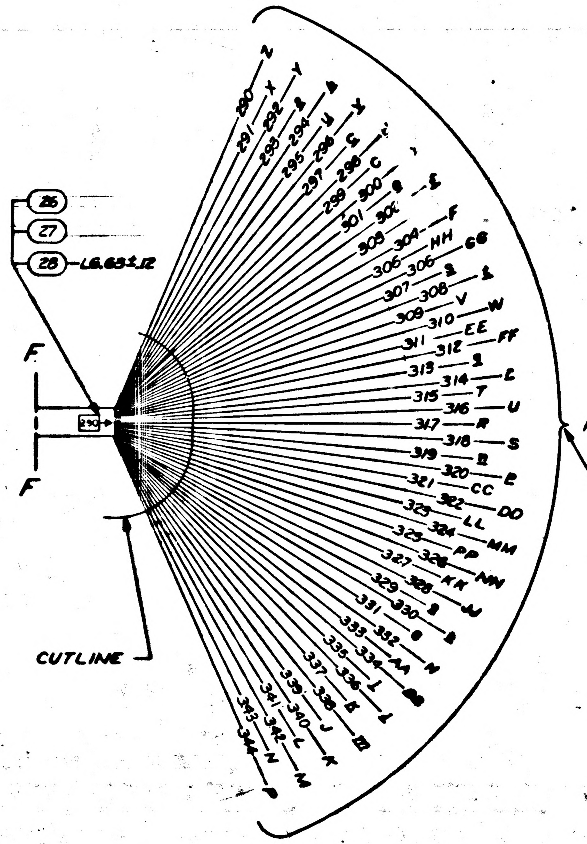
STRIP LEADS .19
DO NOT TIN
GROUP VI


CUTLINE
E
E
357
23
24
25
LG.63±.12
345 T
346 U
347
348
349 R
350 S
351
352
353 AA
354 BB
355
356
357
358 C
359 D
360 E
361 F
362 CC
363 DD
364 EE
365 FF
366
367
368
369
370 N
371 P
372 W
373
374
375
376 L
377 M
378
379
380
381
382 H
383 G
384 J
385 K
385A A
385B B
P12

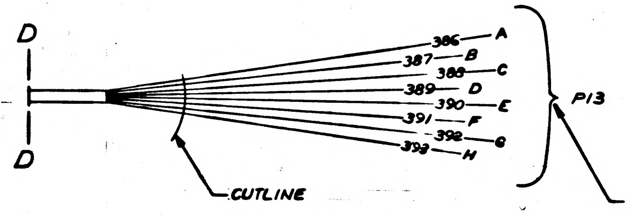
STRIP LEADS .19
DO NOT TIN
GROUP II


CUTLINE
C
C
412
32
33
34
LG.63±.12
394
395 S
396
397 T
398 AA
399
400 U
401
402 V
403
404 W
405 A
406 X
407 B
408 Y
409 C
410 D
411
412 Z
412A EE
412B
412C CC
412D J
412E K
P3

STRIP LEADS .19
DO NOT TIN
GROUP II


26
27
28
LG.63±.12
F
F
290
CUTLINE
290 Z
291 X
292 Y
293
294
295
296
297
298 C
299
300
301
302
303 F
304 HH
305
306 GG
307
308
309 V
310 W
311 EE
312 FF
313
314
315 T
316 U
317 R
318 S
319
320
321 CC
322 DD
323 LL
324 MM
325 PP
326 NN
327 KK
328 JJ
329
330
331
332 H
333 AA
334 BB
335
336
337
338
339 J
340 K
341 L
342 M
343 N
344 P
P11

STRIP LEAD .19
DO NOT TIN
GROUP I


D
D
386 A
387 B
388 C
389 D
390 E
391 F
392 G
393 H
CUTLINE
P13

STRIP LEADS .19
DO NOT TIN
GROUP III

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014434	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020124
SCALE 1/1 WT SHEET 3 OF [illegible]

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR B.Katz CHK APPD		KB

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	240	BRN	22	20	386	SEE TWIST CHART
	239	BLK	22	19	387	
SEE TWIST CHART	236	BRN	22	20	388	SEE TWIST CHART
	235	BLK	22	19	389	
SEE TWIST CHART	229	BRN	22	20	390	SEE TWIST CHART
	228	BLK	22	19	391	
SEE TWIST CHART	233	BRN	22	20	392	SEE TWIST CHART
	232	BLK	22	19	393	
SEE TWIST CHART	231	BLK	22	19	550	SEE TWIST CHART
	230	ORN	22	21	549	
SEE TWIST CHART	238	BLK	22	19	553	SEE TWIST CHART
	234	WHT/RED	22	22	551	
	237	BRN	22	20	552	
LG 3.00±12 **	548	SHLD			227	**LG 3.00±12
	226	WHT	22	18	547	PART OF GROUP I
	546				225	
	224				545	
	544	WHT	22	18	223	
	222	WHT	22	17	543	
	221	BLK			548	
	541	WHT	22	17	220	
	540	BLK			219	
	218	WHT	22	17	539	
	217	BLK			538	
	537	WHT	22	17	216	
	536	BLK			215	
	214	WHT	22	17	535	
	213	BLK			534	
	533	WHT	22	17	212	
	532	BLK			211	
	210	WHT	22	17	531	
	209	BLK			530	
	529	WHT	22	17	208	
	528	BLK			207	
	206	WHT	22	17	527	
	205	BLK			526	
	525	WHT	22	17	204	
	524	BLK			203	
	202	WHT	22	17	523	
	201	BLK			522	
	521	WHT	22	17	200	
	520	BLK			199	
	198	WHT	22	17	519	
	197	BLK			518	
	517	WHT	22	17	196	
	516	BLK			195	
	194	WHT	22	17	515	
	193	BLK			514	
	513	WHT	22	17	192	
	512	BLK			191	
	190	WHT	22	17	511	
	189	BLK			510	
	509	WHT	22	17	188	
	508	BLK			187	
	186	WHT	22	17	507	
	185	BLK			506	
	505	WHT	22	17	184	
	504	BLK			183	
	182	WHT	22	17	503	
	181	BLK			502	
	501	WHT	22	17	180	
	500	BLK			179	
	178	WHT	22	17	499	
	177	BLK			498	
	497	WHT	22	17	176	
	496	BLK			175	
	174	WHT	22	17	495	
	173	BLK			494	
	493	WHT	22	17	172	
	492	BLK			171	
	170	WHT	22	17	491	
	169	BLK			490	
	489	WHT	22	17	168	
	488	BLK			167	
	166	WHT	22	17	487	
	165	BLK			486	
	485	WHT	22	17	164	
	484	BLK			163	
	162	WHT	22	17	483	
	161	BLK			482	
	481	WHT	22	17	160	
	480	BLK			159	
	158	WHT	22	17	469	
	157	BLK			468	
	479	WHT	22	18	156	

GROUP III

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	478	WHT	22	18	155	PART OF GROUP I
	154	WHT	22	17	477	
	153	BLK			476	
	467	WHT	22	17	150	
	466	BLK			149	
	148	WHT	22	17	473	
	147	BLK			472	
	152	WHT	22	17	244	
	151	BLK			246	
	245	WHT	22	18	242	
	247	WHT	22	17	146	
	249	BLK			145	
	248	WHT	22	18	241	
	244	WHT	22	17	475	PART OF GROUP I
	246	BLK			474	
	471	WHT	22	17	247	
	470	BLK			248	
LG 8.00±12 **	144	SHLD			465	**LG 3.00±12
	143	WHT	22	17	255	GROUP VI
	142	BLK			256	
	251	WHT	22	17	141	
	252	BLK			140	
	139	WHT	22	17	253	
	138	BLK			254	
	275	WHT	22	17	137	
	276	BLK			136	
	135	WHT	22	17	271	
	134	BLK			272	
	280	WHT	22	17	133	
	281	BLK			132	
	131	WHT	22	17	284	
	130	BLK			285	
	288	WHT	22	17	129	
	289	BLK			128	
	127	WHT	22	17	263	
	126	BLK			264	
	261	WHT	22	17	125	
	262	BLK			124	
	123	WHT	22	17	265	
	122	BLK			266	
	286	WHT	22	17	121	
	287	BLK			120	
	119	WHT	22	17	282	
	118	BLK			283	
	277	WHT	22	17	117	
	278	BLK			116	
	115	WHT	22	17	273	
	114	BLK			274	
	270	WHT	22	18	69	
	68				279	
	267				67	
	66				259	
	260				65	
	64				269	
	268				70	
	9				257	
	258	WHT	22	18	8	
LG 8.00±.12 **	113	SHLD			250	**LG2.00±.12
	39	WHT	22	17	333	PART OF GROUP I
	38	BLK			334	
	321	WHT	22	17	37	
	322	BLK			36	
	35	WHT	22	17	297	
	34	BLK			298	
	293	WHT	22	17	33	
	294	BLK			32	
	31	WHT	22	17	341	
	30	BLK			342	
	335	WHT	22	17	29	
	336	BLK			28	
	27	WHT	22	17	325	
	26	BLK			326	
	327	WHT	22	17	25	
	328	BLK			24	
	23	WHT	22	17	323	
	22	BLK			324	
	301	WHT	22	17	21	
	302	BLK			20	
	19	WHT	22	17	329	
	18	BLK			330	
	331	WHT	22	17	17	
	332	BLK			16	
	15	WHT	22	17	339	
	14	BLK			340	
	240 B	WHT	22	17	385A	PART OF GROUP II
	240A	BLK			385B	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	299	WHT	22	17	13	PART OF GROUP I
	300	BLK			12	
	11	WHT	22	17	303	
	10	BLK			304	
	343	WHT	22	17	41	
	344	BLK			40	
	43	WHT	22	17	317	
	42	BLK			318	
	319	WHT	22	17	45	
	320	BLK			44	
	47	WHT	22	17	315	
	46	BLK			316	
	313	WHT	22	17	49	
	314	BLK			48	
	51	WHT	22	17	309	
	50	BLK			310	
	291	WHT	22	17	53	
	292	BLK			52	
	55	WHT	22	17	307	
	54	BLK			308	
	295	WHT	22	17	57	
	296	BLK			56	
	59	WHT	22	17	337	
	58	BLK			338	
	305	WHT	22	17	61	
	306	BLK			60	
	63	WHT	22	17	311	
	62	BLK			312	
LG 8.00±.12**	112	SHLD			290	**LG 2.00±.12
	72	WHT	22	17	362	PART OF GROUP II
	71	BLK			363	
	349	WHT	22	17	74	
	350	BLK			73	
	76	WHT	22	17	347	
	75	BLK			348	
	355	WHT	22	17	78	
	356	BLK			77	
	80	WHT	22	17	364	
	79	BLK			365	
	376	WHT	22	17	82	
	377	BLK			81	
	84	WHT	22	17	370	
	83	BLK			371	
	353	WHT	22	17	86	
	354	BLK			85	
	88	WHT	22	17	368	
	87	BLK			369	
	366	WHT	22	17	90	
	367	BLK			89	
	92	WHT	22	17	345	
	91	BLK			346	
	351	WHT	22	17	94	
	352	BLK			93	
	96	WHT	22	17	382	
	95	BLK			383	
	384	WHT	22	17	98	
	385	BLK			97	
	100	WHT	22	17	358	
	99	BLK			359	
	380	WHT	22	17	102	
	381	BLK			101	
	104	WHT	22	17	378	
	103	BLK			379	
	372	WHT	22	17	106	
	373	BLK			105	
	108	WHT	22	17	360	
	107	BLK			361	
	375	WHT	22	17	110	
	374	BLK			109	
LG 8.00±.12**	111	SHLD			357	**LG 2.00±.12
LG 3.00±.12**	464	SHLD			412	**LG 2.00±.12
	411	WHT	22	18	463	PART OF GROUP II
	462				405	
	400				461	
	460				407	
	402				459	
	458				397	
	409				457	
	456				404	
	399				455	
	454				395	
	406				453	
	452				401	
	396				451	
	450				408	
	403				449	
	448				398	
	394				447	
	446	WHT	22	18	410	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	412A	WHT	22	18	417	PART OF GROUP II
	412B				416	
	412C				415	
	412D				414	
	412E	WHT	22	18	413	

TWIST CHART

240-386 WITH 239-387
236-388 WITH 235-389
229-390 WITH 228-391
233-392 WITH 232-393
231-550 WITH 230-549
238-553 WITH 234-551

FOR INFORMATION ONLY 0
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014634	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
GHT APPROVAL
GHT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

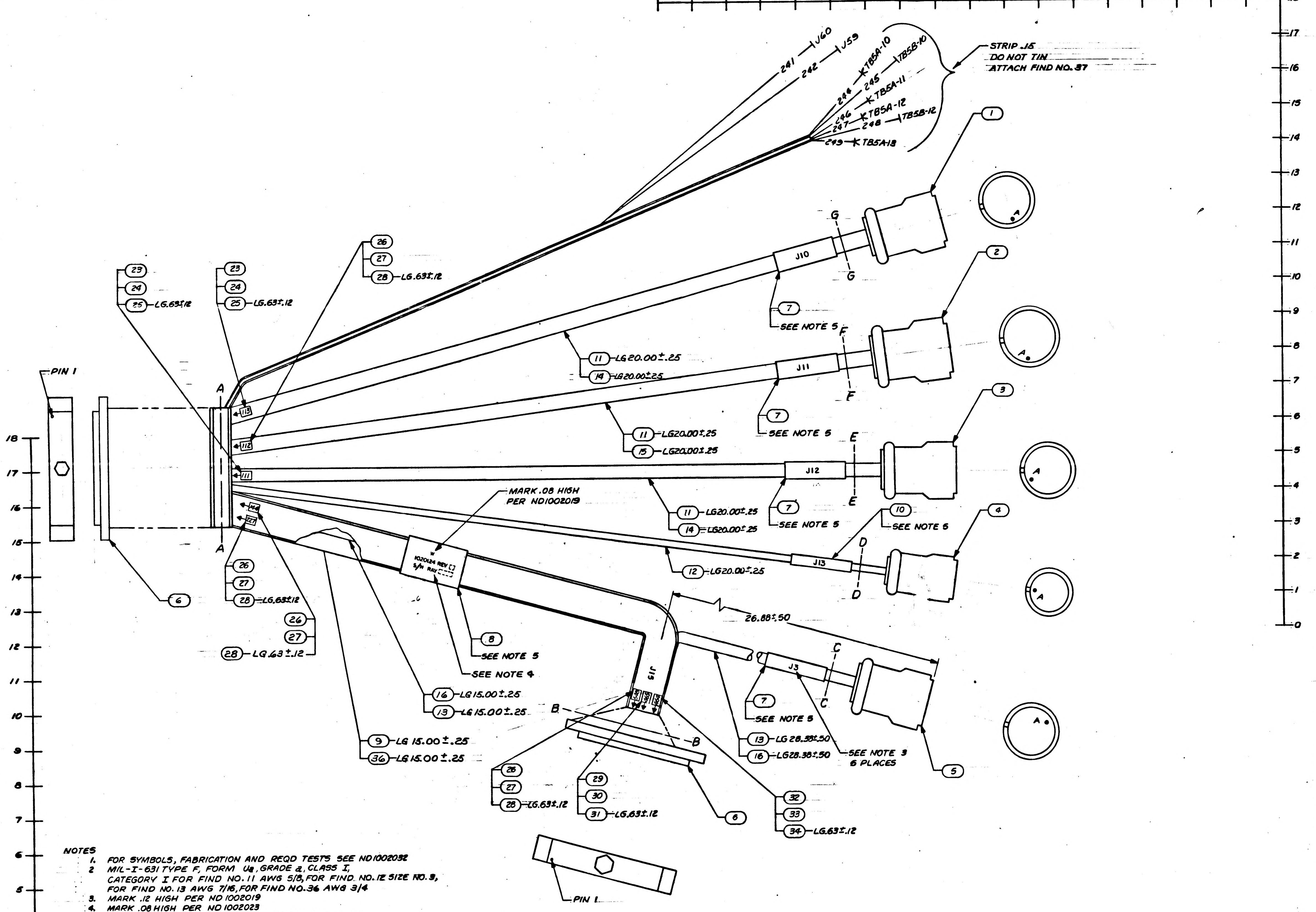
WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 1020124
SCALE NONE
SHEET 4 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


241 J60
242 J59
244 TB5A-10
245 TB5B-10
245 TB5A-11
246 TB5A-12
247
248 TB5B-12
249 TB5A-13
STRIP .15
DO NOT TIN
ATTACH FIND NO. 37
1
2
3
4
5
6
G
F
E
D
C
B
A
J10
J11
J12
J13
J3
J15
J13
J12
J11
J14
J27
PIN 1
23
24
25 LG.63±.12
23
24
25 LG.63±.12
26
27
28 LG.63±.12
11 LG20.00±.25
14 LG20.00±.25
11 LG20.00±.25
15 LG20.00±.25
11 LG20.00±.25
14 LG20.00±.25
12 LG20.00±.25
7 SEE NOTE 5
7 SEE NOTE 5
7 SEE NOTE 5
10 SEE NOTE 5
7 SEE NOTE 5
MARK .08 HIGH
PER ND1002019
W
1020124 REV [ ]
S/N
26
27
28 LG.63±.12
26
27
28 LG.63±.12
8 SEE NOTE 5
SEE NOTE 4
16 LG15.00±.25
13 LG15.00±.25
9 LG 15.00±.25
36 LG15.00±.25
26.88±.50
13 LG28.38±.50
16 LG28.38±.50
SEE NOTE 3
6 PLACES
26
27
28 LG.63±.12
29
30
31 LG.63±.12
32
33
34 LG.63±.12
6
6
PIN 1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2 MIL-I-631 TYPE F, FORM U2, GRADE A, CLASS I, CATEGORY I FOR FIND NO. 11 AWG 5/8, FOR FIND NO. 12 SIZE NO. 3, FOR FIND NO. 13 AWG 7/16, FOR FIND NO. 36 AWG 3/4
3. MARK .12 HIGH PER ND 1002019
4. MARK .08 HIGH PER ND 1002023
5. BOND FIND NO. 7, 8 AND 10 USING TETRAHYDROFURAN WITH 10% POLYVINAL CHLORIDE
6. QQ-B-575 FOR FIND NO. 14 BRAID SIZE 1/2, FOR FIND NO. 15 BRAID SIZE 9/16 FOR FIND NO. 16 BRAID SIZE 3/8, FOR FIND NO. 9 BRAID SIZE 21/32
7. MIL-I-23053 CLASS 1 COLOR BLACK FOR FIND NO. 25 SIZE NO. 1/2, FOR FIND NO. 28 SIZE NO. 5/8, FOR FIND NO. 31 SIZE NO. 7/16, FOR FIND NO. 34 SIZE NO. 3/8
8. ✱✱ ATTACH FIND NO. 19
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 6
10. NUMBERS PRECEDING BALLOONS DENOTE QUANTITIES

✱DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020126	ELECTRICAL SCHEMATIC	REF
	6	MS25036-1	TERMINAL LUG	37
✱	2.0	SEE NOTE 2	SLEEVING	36
	488	1010738-2	CONTACT, ELEC, SOCKET	35
✱	0.5	SEE NOTE 7	SLEEVING	34
	2	1000242-29	FERRULE, ELEC CONDUCTOR	33
	2	1000243-31	FERRULE, ELEC CONDUCTOR	32
✱	0.5	SEE NOTE 7	SLEEVING	31
	2	1000242-30	FERRULE, ELEC CONDUCTOR	30
	2	1000243-34	FERRULE, ELEC CONDUCTOR	29
✱	0.5	SEE NOTE 7	SLEEVING	28
	4	1000242-34	FERRULE, ELEC CONDUCTOR	27
	4	1000242-33	FERRULE, ELEC CONDUCTOR	26
✱	0.5	SEE NOTE 7	SLEEVING	25
	4	1000242-33	FERRULE, ELEC CONDUCTOR	24
	4	1000243-37	FERRULE, ELEC CONDUCTOR	23
✱	2.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHITE/RED	22
✱	2.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, ORANGE	21
✱	11.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BROWN	20
✱	17.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, BLACK	19
✱	83.0	MIL-W-16878/4, TYPE E22	WIRE, ELEC, WHITE	18
✱	220.0	1014341-11	WIRE, ELEC	17
✱	4.0	SEE NOTE 6	BRAID, WIRE	16
✱	2.0	SEE NOTE 6	BRAID, WIRE	15
✱	4.0	SEE NOTE 6	BRAID, WIRE	14
✱	9.0	SEE NOTE 2	SLEEVING	13
✱	2.0	SEE NOTE 2	SLEEVING	12
✱	6.0	SEE NOTE 2	SLEEVING	11
	1	1014472-1A	BAND MARKER, CABLE	10
✱	2.0	SEE NOTE 6	BRAID, WIRE	9
	1	1014472-8	BAND MARKER, CABLE	8
	4	1014472-3A	BAND MARKER, CABLE	7
	2	1010642-2	CONNECTOR	6
	1	MS3126F-22-55X5	CONNECTOR, PLUG	5
	1	MS3126F-16-8P	CONNECTOR, PLUG	4
	1	MS3126F-22-555	CONNECTOR, PLUG	3
	1	MS3126F-24-61W5	CONNECTOR, PLUG	2
	1	MS3126F-22-55W5	CONNECTOR, PLUG	1

LIST OF MATERIALS

SH 1	SH 2	SH 3	SH 4

REVISION STATUS OF SHEETS

1014434	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.0 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Carlson DATE 27 [illegible]
CHECKED C. [illegible] 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

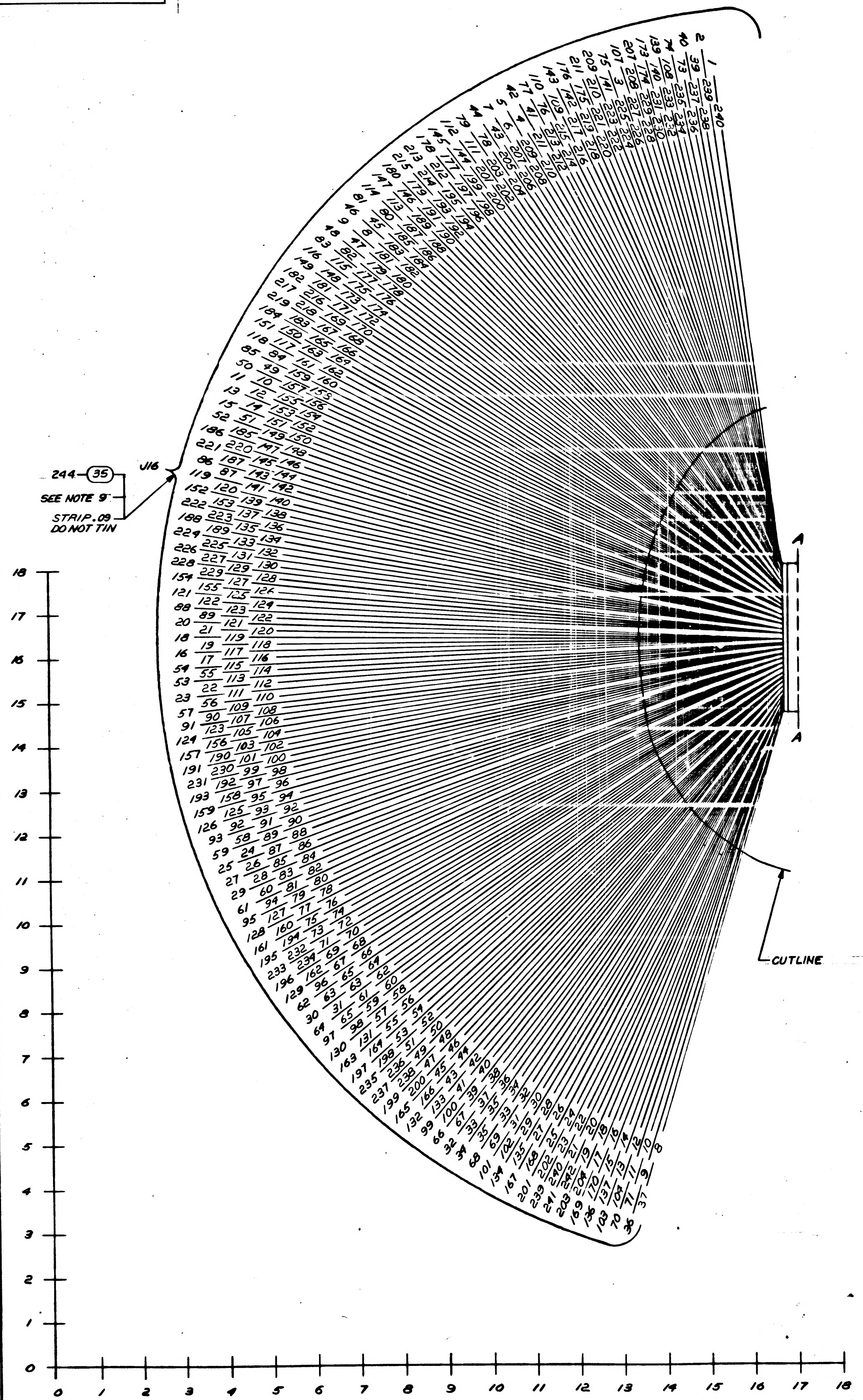
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020124
SCALE 1/1
WT
SHEET 1 OF 4

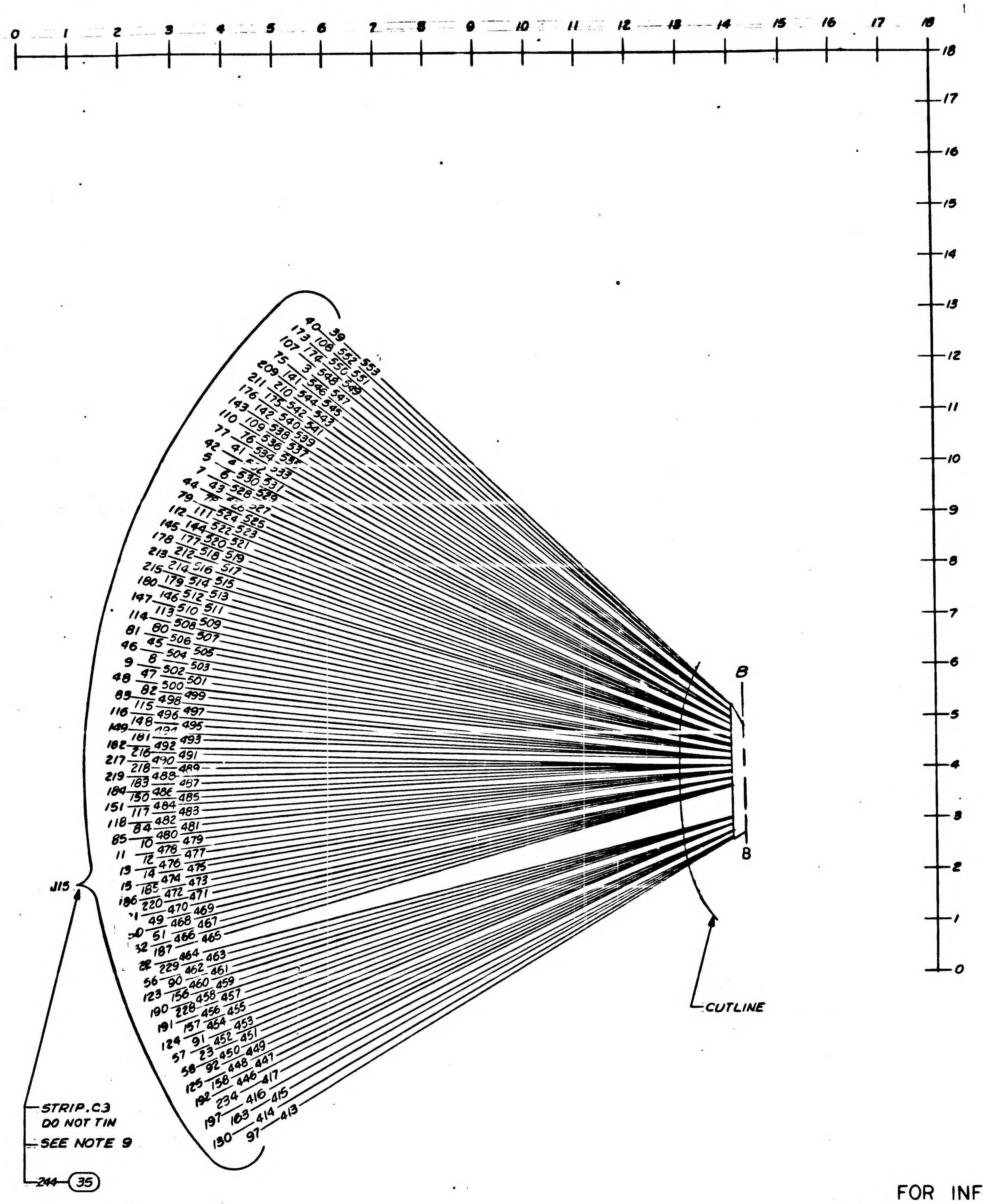
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		





FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014434	1014465
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson DATE
CHECKED A Cusumano 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

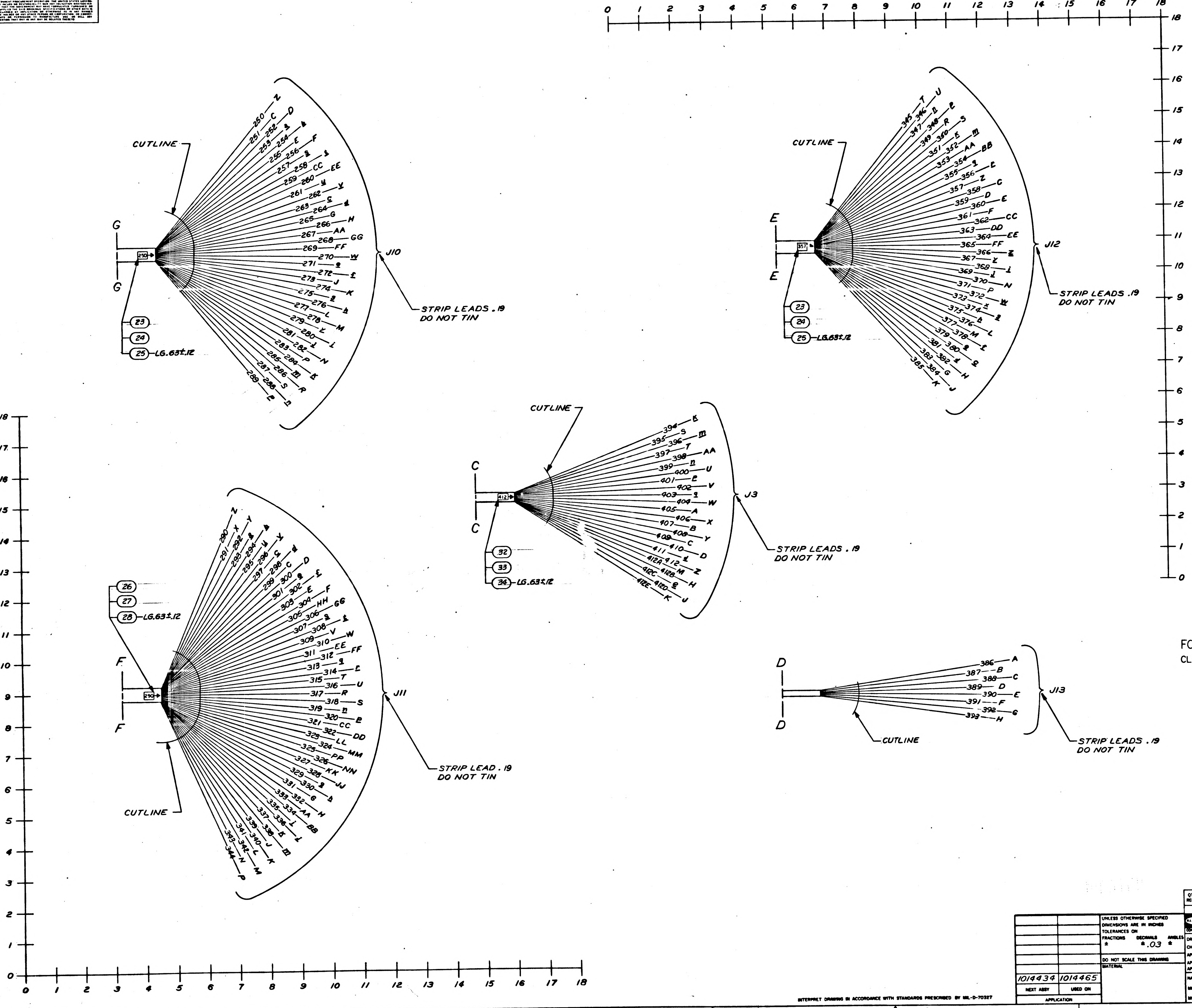
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020124
SCALE 1/1
WT
SHEET 2 OF 4

1020124

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


4
3
2
1
C
B
A
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
G
G
250
CUTLINE
23
24
25 LG.63±.12
250 Z
251 C
252 D
253 a
254 b
255 E
256 F
257 g
258 h
259 CC
260 EE
261 u
262 v
263 c
264 d
265 G
266 H
267 AA
268 GG
269 FF
270 W
271 e
272 f
273 J
274 K
275 g
276 h
277 L
278 M
279 x
280 i
281 j
282 N
283 P
284 k
285 m
286 R
287 S
288 n
289 p
J10
STRIP LEADS .19
DO NOT TIN
E
E
357
CUTLINE
23
24
25 LG.63±.12
345 T
346 U
347 n
348 p
349 R
350 S
351 k
352 m
353 AA
354 BB
355 a
356 b
357 Z
358 C
359 D
360 E
361 F
362 CC
363 DD
364 EE
365 FF
366 z
367 y
368 i
369 j
370 N
371 P
372 w
373 x
374 g
375 h
376 L
377 M
378 f
379 e
380 c
381 d
382 H
383 G
384 J
385 K
J12
STRIP LEADS .19
DO NOT TIN
C
C
412
CUTLINE
32
33
34 LG.63±.12
394 k
395 S
396 m
397 T
398 AA
399 n
400 U
401 p
402 V
403 q
404 W
405 A
406 X
407 B
408 Y
409 C
410 D
411 d
412 Z
412A M
412B H
412C e
412D J
412E K
J3
STRIP LEADS .19
DO NOT TIN
F
F
290
26
27
28 LG.63±.12
CUTLINE
290 Z
291 X
292 Y
293 a
294 b
295 u
296 v
297 c
298 d
299 C
300 D
301 e
302 f
303 E
304 F
305 HH
306 GG
307 s
308 t
309 V
310 W
311 EE
312 FF
313 q
314 r
315 T
316 U
317 R
318 S
319 n
320 p
321 CC
322 DD
323 LL
324 MM
325 PP
326 NN
327 KK
328 JJ
329 g
330 h
331 G
332 H
333 AA
334 BB
335 i
336 j
337 k
338 m
339 J
340 K
341 L
342 M
343 N
344 P
J11
STRIP LEAD .19
DO NOT TIN
D
D
CUTLINE
386 A
387 B
388 C
389 D
390 E
391 F
392 G
393 H
J13
STRIP LEADS .19
DO NOT TIN

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014434	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.C. Taylor DATE
CHECKED 29 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020124
SCALE 1/1
WT
SHEET 3 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CLASS B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
SEE TWIST CHART	240	BRN	22	20	386	SEE TWIST CHART
	239	BLK	22	19	387	
SEE TWIST CHART	236	BRN	22	20	388	SEE TWIST CHART
	235	BLK	22	19	389	
SEE TWIST CHART	229	BRN	22	20	390	SEE TWIST CHART
	228	BLK	22	19	391	
SEE TWIST CHART	233	BRN	22	20	392	SEE TWIST CHART
	232	BLK	22	19	393	
SEE TWIST CHART	231	BLK	22	19	550	SEE TWIST CHART
	230	ORN	22	21	549	
SEE TWIST CHART	238	BLK	22	19	553	SEE TWIST CHART
	234	WHT/RED	22	22	551	
	237	BRN	22	20	552	
LG 3.00±.12 **	548	SHLD			227	** LG 8.00±.12
	226	WHT	22	18	547	
	546	↕	↕	↕	225	
	224	↕	↕	↕	545	
	544	WHT	22	18	223	
	222	WHT	22	17	543	
	221	BLK			542	
	541	WHT	22	17	220	
	540	BLK			219	
	218	WHT	22	17	539	
	217	BLK			538	
	537	WHT	22	17	216	
	536	BLK			215	
	214	WHT	22	17	535	
	213	BLK			534	
	533	WHT	22	17	212	
	532	BLK			211	
	210	WHT	22	17	531	
	209	BLK			530	
	529	WHT	22	17	208	
	528	BLK			207	
	206	WHT	22	17	527	
	205	BLK			526	
	525	WHT	22	17	204	
	524	BLK			203	
	202	WHT	22	17	523	
	201	BLK			522	
	521	WHT	22	17	200	
	520	BLK			199	
	198	WHT	22	17	519	
	197	BLK			518	
	517	WHT	22	17	196	
	516	BLK			195	
	194	WHT	22	17	515	
	193	BLK			514	
	513	WHT	22	17	192	
	512	BLK			191	
	190	WHT	22	17	511	
	189	BLK			510	
	509	WHT	22	17	188	
	508	BLK			187	
	186	WHT	22	17	507	
	185	BLK			506	
	505	WHT	22	17	184	
	504	BLK			183	
	182	WHT	22	17	503	
	181	BLK			502	
	501	WHT	22	17	180	
	500	BLK			179	
	178	WHT	22	17	499	
	177	BLK			498	
	497	WHT	22	17	176	
	496	BLK			175	
	174	WHT	22	17	495	
	173	BLK			494	
	493	WHT	22	17	172	
	492	BLK			171	
	170	WHT	22	17	491	
	169	BLK			490	
	489	WHT	22	17	168	
	488	BLK			167	
	166	WHT	22	17	487	
	165	BLK			486	
	485	WHT	22	17	164	
	484	BLK			163	
	162	WHT	22	17	483	
	161	BLK			482	
	481	WHT	22	17	160	
	480	BLK			159	
	158	WHT	22	17	469	
	157	BLK			468	
	479	WHT	22	18	156	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	478	WHT	22	18	155	
	154	WHT	22	17	477	
	153	BLK			476	
	467	WHT	22	17	150	
	466	BLK			149	
	148	WHT	22	17	473	
	147	BLK			472	
	152	WHT	22	17	244	
	151	BLK			246	
	245	WHT	22	18	242	
	247	WHT	22	17	146	
	249	BLK			145	
	248	WHT	22	18	241	
	244	WHT	22	17	475	
	246	BLK			474	
	471	WHT	22	17	247	
	470	BLK			249	
LG 8.00±.12 **	144	SHLD			465	** LG 3.00±.12
	143	WHT	22	17	255	
	142	BLK			256	
	251	WHT	22	17	141	
	252	BLK			140	
	139	WHT	22	17	253	
	138	BLK			254	
	275	WHT	22	17	137	
	276	BLK			136	
	135	WHT	22	17	271	
	134	BLK			272	
	280	WHT	22	17	133	
	281	BLK			132	
	131	WHT	22	17	284	
	130	BLK			285	
	288	WHT	22	17	129	
	289	BLK			128	
	127	WHT	22	17	263	
	126	BLK			264	
	261	WHT	22	17	125	
	262	BLK			124	
	123	WHT	22	17	265	
	122	BLK			266	
	286	WHT	22	17	121	
	287	BLK			120	
	119	WHT	22	17	282	
	118	BLK			283	
	277	WHT	22	17	117	
	278	BLK			116	
	115	WHT	22	17	273	
	114	BLK			274	
	270	WHT	22	18	69	
	68	↕	↕	↕	279	
	267	↕	↕	↕	67	
	66	↕	↕	↕	259	
	260	↕	↕	↕	65	
	64	↕	↕	↕	269	
	268	↕	↕	↕	70	
	9	↕	↕	↕	257	
	258	WHT	22	18	8	
LG 8.00±.12 **	113	SHLD			250	**LG2.00±.12
	39	WHT	22	17	333	
	38	BLK			334	
	321	WHT	22	17	37	
	322	BLK			36	
	35	WHT	22	17	297	
	34	BLK			298	
	293	WHT	22	17	33	
	294	BLK			32	
	31	WHT	22	17	341	
	30	BLK			342	
	335	WHT	22	17	29	
	336	BLK			28	
	27	WHT	22	17	325	
	26	BLK			326	
	327	WHT	22	17	25	
	328	BLK			24	
	23	WHT	22	17	323	
	22	BLK			324	
	301	WHT	22	17	21	
	302	BLK			20	
	19	WHT	22	17	329	
	18	BLK			330	
	331	WHT	22	17	17	
	332	BLK			16	
	15	WHT	22	17	339	
	14	BLK			340	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	229	WHT	22	17	13	
	300	BLK			12	
	11	WHT	22	17	303	
	10	BLK			304	
	343	WHT	22	17	41	
	344	BLK			40	
	43	WHT	22	17	317	
	42	BLK			318	
	319	WHT	22	17	45	
	320	BLK			44	
	47	WHT	22	17	315	
	46	BLK			316	
	313	WHT	22	17	49	
	314	BLK			48	
	51	WHT	22	17	309	
	50	BLK			310	
	291	WHT	22	17	53	
	292	BLK			52	
	55	WHT	22	17	307	
	54	BLK			308	
	295	WHT	22	17	57	
	296	BLK			56	
	59	WHT	22	17	337	
	58	BLK			338	
	305	WHT	22	17	61	
	306	BLK			60	
	63	WHT	22	17	311	
	62	BLK			312	
LG 8.00±.12**	112	SHLD			290	**LG 2.00±.12
	72	WHT	22	17	362	
	71	BLK			363	
	349	WHT	22	17	74	
	350	BLK			73	
	76	WHT	22	17	347	
	75	BLK			348	
	355	WHT	22	17	78	
	356	BLK			77	
	80	WHT	22	17	364	
	79	BLK			365	
	376	WHT	22	17	82	
	377	BLK			81	
	84	WHT	22	17	370	
	83	BLK			371	
	353	WHT	22	17	86	
	354	BLK			85	
	88	WHT	22	17	368	
	87	BLK			369	
	366	WHT	22	17	90	
	367	BLK			89	
	92	WHT	22	17	345	
	91	BLK			346	
	351	WHT	22	17	94	
	352	BLK			93	
	96	WHT	22	17	382	
	95	BLK			383	
	384	WHT	22	17	98	
	385	BLK			97	
	100	WHT	22	17	358	
	99	BLK			359	
	380	WHT	22	17	102	
	381	BLK			101	
	104	WHT	22	17	378	
	103	BLK			379	
	372	WHT	22	17	106	
	373	BLK			105	
	108	WHT	22	17	360	
	107	BLK			361	
	375	WHT	22	17	110	
	374	BLK			109	
LG 8.00±.12**	111	SHLD			357	**LG 2.00±.12
LG 3.00±.12**	464	SHLD			412	**LG2.00±.12
	411	WHT	22	18	463	
	462	↕	↕	↕	405	
	400	↕	↕	↕	461	
	460	↕	↕	↕	407	
	402	↕	↕	↕	459	
	458	↕	↕	↕	397	
	409	↕	↕	↕	457	
	456	↕	↕	↕	404	
	399	↕	↕	↕	455	
	454	↕	↕	↕	395	
	406	↕	↕	↕	453	
	452	↕	↕	↕	401	
	396	↕	↕	↕	451	
	450	↕	↕	↕	408	
	403	↕	↕	↕	449	
	448	↕	↕	↕	398	
	394	↕	↕	↕	447	
	446	WHT	22	18	410	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	412A	WHT	22	18	417	
	412B	↕	↕	↕	416	
	412C	↕	↕	↕	415	
	412D	↕	↕	↕	414	
	412E	WHT	22	18	413	

TWIST CHART
240-386 WITH 239-387
236-388 WITH 235-389
229-390 WITH 228-391
233-392 WITH 232-393
231-550 WITH 230-549
238-553 WITH 234-551

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. [illegible] DATE [illegible]

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014434	1014465	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

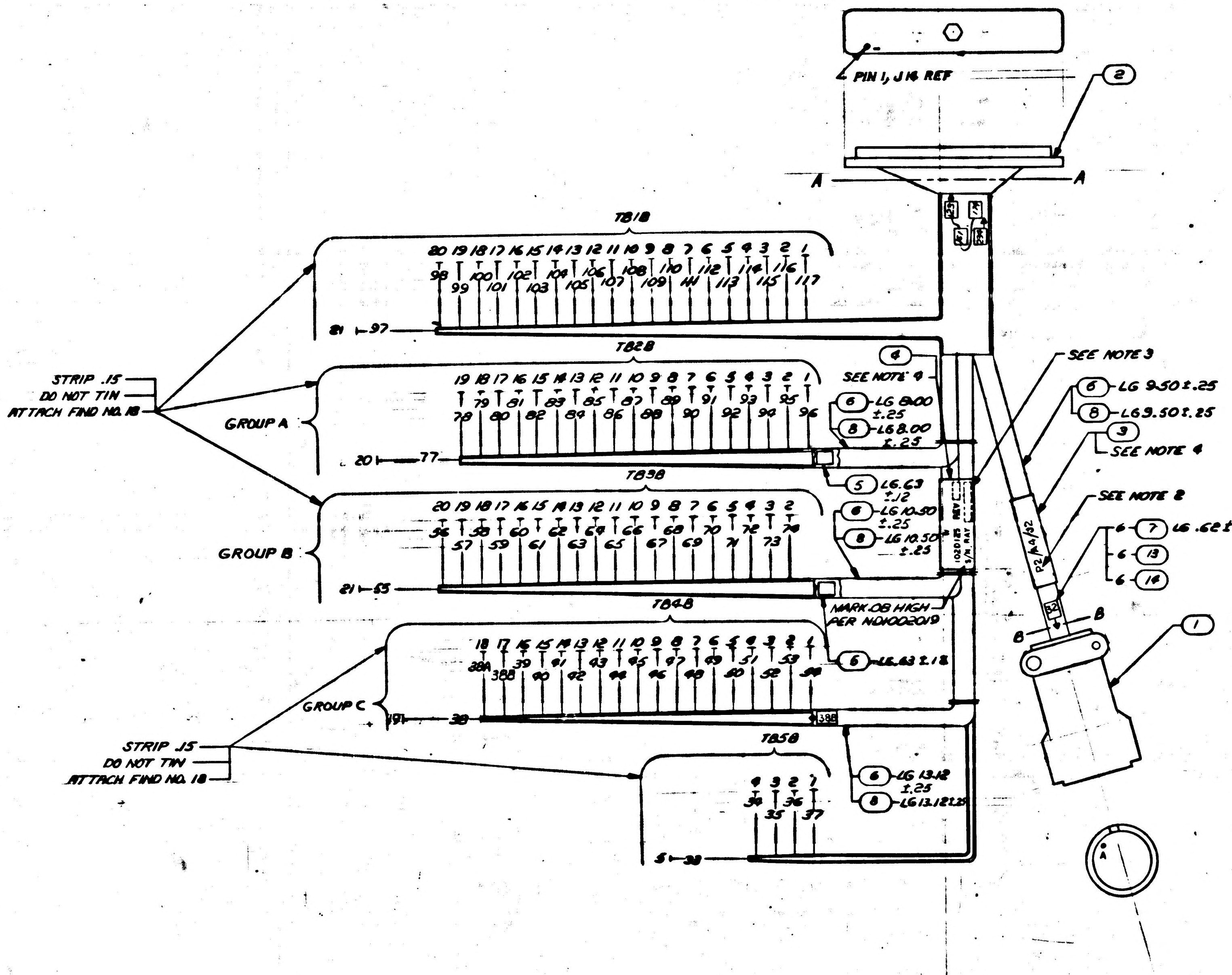
CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020124
SCALE NONE
WT
SHEET 4 OF 4

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020124

INCHES
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVED
REVISIONS			
-	CLB RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR ST. CHK APPD	Mar 69	



PIN 1, J16 REF
2
A
A
TB1B
80 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117
21 ⊢ 97
TB2B
19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
20 ⊢ 77
STRIP .15
DO NOT TIN
ATTACH FIND NO. 18
GROUP A
TB3B
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2
56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
GROUP B
21 ⊢ 55
TB4B
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
38A 38B 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54
GROUP C
19 ⊢ 38
38B
STRIP .15
DO NOT TIN
ATTACH FIND NO. 18
TB5B
4 3 2 1
34 35 36 37
5 ⊢ 38
4
SEE NOTE 4
6 LG 8.00 ±.25
8 LG 8.00 ±.25
5 LG 6.63 ±.12
6 LG 10.50 ±.25
8 LG 10.50 ±.25
1020125 S/N RAY REV
MARK .08 HIGH PER ND1002019
6 LG 6.63 ±.12
6 LG 13.12 ±.25
8 LG 13.12 ±.25
SEE NOTE 3
6 LG 9.50 ±.25
8 LG 9.50 ±.25
3
SEE NOTE 4
SEE NOTE 2
6 7 LG .62 ±.12
6 13
6 14
P2/A4/J2
J2
B
B
1
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631, TYPE F, FORM Ua, GRADE A, CLASS 1, CATEGORY 1 FOR FIND NO. 6, AWG 7/16
6. MIL-I-23053, CLASS I, COLOR BLACK FOR FIND NO. 7, SIZE 3/16 FOR FIND NO. 5 SIZE 5/16
7. QQ-B-575, FOR FIND NO. 8, BRAID SIZE 3/8, AWG 34
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 2
10. ** INDICATES SEE INTERNAL GROUNDING SHEATH CONNECTION CHART

A	A	A
SH 1	SH 2	SH 3

REVISION STATUS OF SHEETS

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020127	SCHEMATIC ELECTRICAL	REF
	85	MS25036-1	TERMINAL, LUG	18
	244	1010738-2	CONTACT, ELEC, SOCKET	17
*	1.7	MIL-W-16878/4, TYPE E, 22	WIRE, ELECTRICAL, BRN	16
*	424	1014341-11	WIRE, ELECTRICAL	15
	6	1000243-34	FERRULE, ELEC CONDUCTOR	14
	6	1000242-30	FERRULE, ELEC CONDUCTOR	13
*	1.5	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, ORN	12
*	2.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, RED/WHT	11
*	36.3	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHT	10
*	7.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLK	9
*	3.3	SEE NOTE 7	WIRE, BRAID	8
*	0.5	SEE NOTE 6	SLEEVING	7
*	3.3	SEE NOTE 5	SLEEVING	6
*	0.2	SEE NOTE 6	SLEEVING	5
	1	1014472-4	BAND MARKER, CABLE	4
	1	1014472-3A	BAND MARKER, CABLE	3
	1	1010642-1	CONNECTOR	2
	1	MS3126F-24-61P2	CONNECTOR	1

LIST OF MATERIALS

* DENOTES LENGTH IN FEET

1014438	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R.D. DATE
CHECKED 22 Nov 68
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

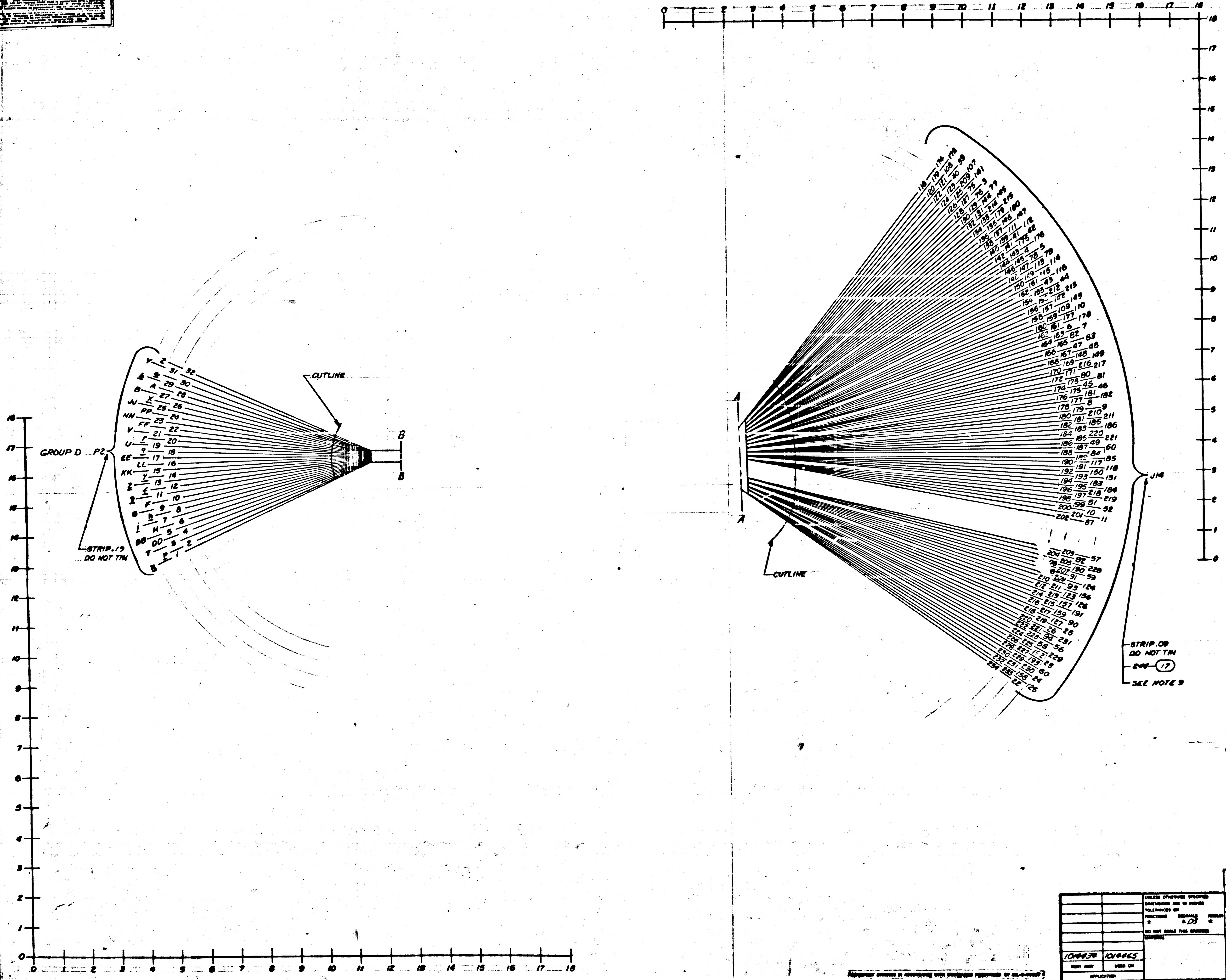
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020125
SCALE 1/1 WT SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR. B.C. CHK		


GROUP D
P2
Y
Z
31
32
A
29
30
B
27
28
JJ
X
25
26
PP
NN
23
24
FF
22
V
21
20
U
r
19
18
EE
17
16
LL
KK
15
14
y
13
12
f
11
10
F
9
8
h
7
6
H
5
4
BB
DD
3
2
T
P
1
STRIP .19
DO NOT TIN
CUTLINE
B
B
A
A
CUTLINE
J14
STRIP .09
DO NOT TIN
17
SEE NOTE 9

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 3/19/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014437	1014465
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN W. Carleton
CHECKED A. Cusano
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
NASA APPROVAL
NASA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 1020125
SCALE 1/1
WT
SHEET 2 OF 3

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		
A	CHANGED PER TDRR 07350 DR S.T. CHK APPD		

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND [illegible] IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	121	BLK	22	9	37	
	36	BLK	22	9	119	
	118	ORN	22	12	35	
	34	WHT/RED	22	11	120	
	122	BRN	22	16	38	
GROUP C { ATTACH FIND NO.9 L62.00	123	SHLD			38B	ATTACH FIND NO.9 L6 2.75 } GROUP C
GROUP A	93	WHT	22	10	124	GROUP A
	125	↕	↕	↕	94	
	95	↕	↕	↕	126	
	127	WHT	22	10	96	
	84	WHT	22	15	128	
	83	BLK			129	
GROUP B	130	WHT	22	15	74	GROUP B
	131	BLK			73	
	64	WHT	22	15	132	
	63	BLK			133	
	134	WHT	22	15	62	
	135	BLK			61	
	60	WHT	22	15	136	
	59	BLK			137	
	138	WHT	22	15	72	
	139	BLK			71	
GROUP A	82	WHT	22	15	140	GROUP A
	81	BLK			141	
	142	WHT	22	15	90	
	143	BLK			89	
	80	WHT	22	15	144	
	79	BLK			145	
	146	WHT	22	15	70	
	147	BLK			69	
GROUP B	58	WHT	22	15	148	GROUP B
	57	BLK			149	
GROUP C	150	WHT	22	15	44	GROUP C
	151	BLK			43	
GROUP B	68	WHT	22	15	152	GROUP B
	67	BLK			153	
GROUP A	154	WHT	22	15	78	GROUP A
	155	BLK			77	
	88	WHT	22	15	156	
	87	BLK			157	
	158	WHT	22	15	86	
	159	BLK			85	
GROUP C	38A	WHT	22	15	160	* * GROUP C
	38	BLK			161	
GROUP B	162	WHT	22	15	66	GROUP B
	163	BLK			65	
GROUP C	42	WHT	22	15	164	GROUP C
	41	BLK			165	
	166	WHT	22	15	40	
	167	BLK			39	
	46	WHT	22	15	168	
	45	BLK			169	
	170	WHT	22	15	50	
	171	BLK			49	
GROUP B	56	WHT	22	15	172	GROUP B
	55	BLK			173	
* * GROUP C	174	WHT	22	15	54	GROUP C
	175	BLK			53	
	48	WHT	22	15	176	
	47	BLK			177	

ASSEMBLY INFORMATION CHART

* FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
GROUP C	178	WHT	22	15	52	GROUP C
	179	BLK			51	
GROUP A	92	WHT	22	15	180	GROUP A
	91	BLK			181	
GROUP D	182	WHT	22	15	103	GROUP D
	183	BLK			102	
	105	WHT	22	15	184	
	104	BLK			185	
	186	WHT	22	15	107	
	187	BLK			106	
	109	WHT	22	15	188	
	108	BLK			189	
	190	WHT	22	15	111	
	191	BLK			110	
	113	WHT	22	15	192	
	112	BLK			193	
	194	WHT	22	15	115	
	195	BLK			114	
	117	WHT	22	15	196	
	116	BLK			197	
	198	WHT	22	15	101	
	199	BLK			100	
	99	WHT	22	10	200	
	201	WHT	22	10	98	
	97	BLK	22	9	202	
	203	WHT	22	10	28	
	15	↕	↕	↕	204	
	205	↕	↕	↕	26	
	16	↕	↕	↕	206	
	207	↕	↕	↕	11	
	25	↕	↕	↕	208	
	209	↕	↕	↕	23	
	18	↕	↕	↕	210	
	211	↕	↕	↕	27	
	29	↕	↕	↕	212	
	213	↕	↕	↕	9	
	22	↕	↕	↕	214	
	215	↕	↕	↕	21	
	13	↕	↕	↕	216	
	217	↕	↕	↕	30	
	2	↕	↕	↕	218	
	219	↕	↕	↕	7	
	1	↕	↕	↕	220	
	221	↕	↕	↕	8	
	5	↕	↕	↕	222	
	223	↕	↕	↕	31	
	24	↕	↕	↕	224	
	225	↕	↕	↕	12	
	20	WHT	22	10	226	
	227	WHT	22	15	17	
	231	BLK			19	
	4	WHT	22	10	228	
	229	↕	↕	↕	6	
	3	↕	↕	↕	230	
	232	↕	↕	↕	10	
	14	WHT	22	10	233	
ATTACH FIND NO.9 L62.50	234	SHLD			32	ATTACH FIND NO.9 L62.50

NOTE: TO PROPERLY FABRICATE CABLE, FABRICATE GROUP A, GROUP B, GROUP C, & GROUP D IN THAT ORDER

INTERNAL GROUND SHEATH CONN			
FROM	TO	LENGTH	FIND NO.
123	161	1	9
161	174	1.5	9

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/14/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1014434	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.12 ANGLES ±

DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Carlson DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

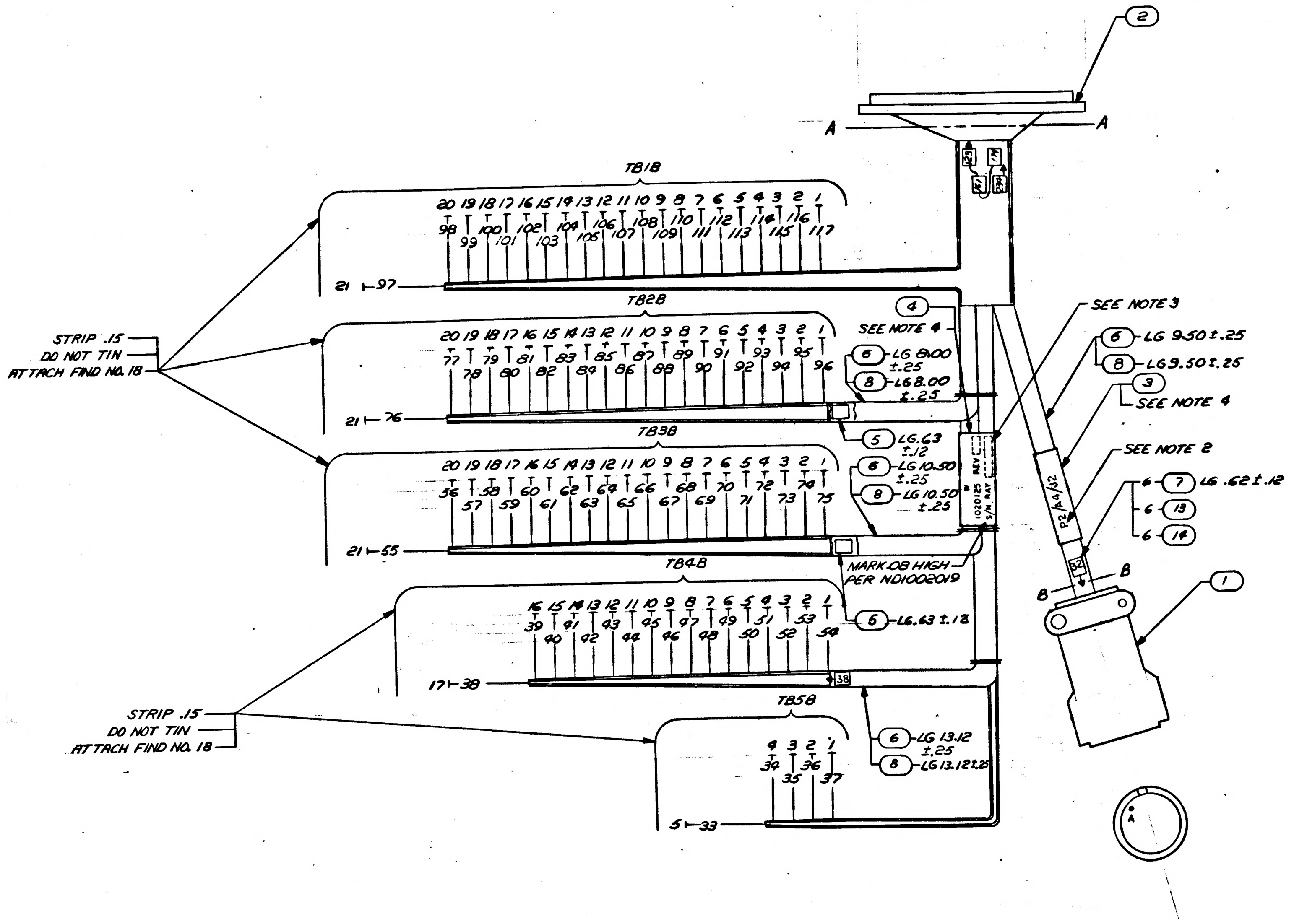
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020125
SCALE NONE WT SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
-	CLB RELEASED PER TDRR		



TB1B
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117
21 ⊢97
TB2B
77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
21 ⊢76
TB3B
56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
21 ⊢55
TB4B
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54
17 ⊢38
38
TB5B
4 3 2 1
34 35 36 37
5 ⊢33
STRIP .15
DO NOT TIN
ATTACH FIND NO. 18
STRIP .15
DO NOT TIN
ATTACH FIND NO. 18
A
A
2
4
SEE NOTE 4
6 -LG 8.00 ±.25
8 -LG 8.00 ±.25
5 LG .63 ±.12
6 -LG 10.50 ±.25
8 -LG 10.50 ±.25
MARK .08 HIGH PER ND1002019
6 -LG .63 ±.12
6 -LG 13.12 ±.25
8 -LG 13.12 ±.25
W 1020125 REV S/N RAY
SEE NOTE 3
6 -LG 9.50 ±.25
8 -LG 9.50 ±.25
3
SEE NOTE 4
SEE NOTE 2
P2/A4/J2
6 - 7 LG .62 ±.12
6 - 13
6 - 14
32
B
B
1
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. E6320 DATE 2/14/64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MARK .12 HIGH BLACK CHARACTERS PER ND1002019
3. MARK .08 HIGH PER ND1002023
4. BOND FIND NO. 3, 4 AND 5 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
5. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, FOR FIND NO. 6, AWG 7/16
6. MIL-I-23053, CLASS I, COLOR BLACK FOR FIND NO. 7, SIZE 7/16 FOR FIND NO. 18 SIZE 5/16
7. QQ-B-575, FOR FIND NO. 8, BRAID SIZE 3/8, AWG 34
8. NUMBERS PRECEDING BALLOONS INDICATE QUANTITIES
9. DISCARD CONTACTS SUPPLIED WITH FIND NO. 2
10. ** INDICATES SEE INTERNAL GROUNDING SHEATH CONNECTION CHART

	SH 1	SH 2	SH 3
	—	—	—

REVISION STATUS OF SHEETS

* DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	☒	1020127	SCHEMATIC, ELECTRICAL	REF
	85	MS25036-1	TERMINAL, LUG	18
	244	1010738-2	CONTACT, ELEC, SOCKET	17
*	1.7	MIL-W-16878/4, TYPE E, 22	WIRE, ELECTRICAL, BRN	16
*	424	1014391-11	WIRE, ELECTRICAL	15
	6	1000243-34	FERRULE, ELEC CONDUCTOR	14
	6	1000242-30	FERRULE, ELEC CONDUCTOR	13
*	1.5	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, ORN	12
*	2.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, RED/WHT	11
*	36.3	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, WHT	10
*	7.0	MIL-W-16878/4, TYPE E 22	WIRE, ELECTRICAL, BLK	9
*	3.3	SEE NOTE 7	WIRE, BRAID	8
*	0.5	SEE NOTE 6	SLEEVING	7
*	3.3	SEE NOTE 5	SLEEVING	6
*	0.2	SEE NOTE 6	SLEEVING	5
	1	1014472-4	BAND MARKER, CABLE	4
	1	1014472-3A	BAND MARKER, CABLE	3
	1	1010642-1	CONNECTOR	2
	1	MS3126F-24-61P2	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014439	1014465

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN R. D. Olsen DATE
CHECKED A. Cogg 22 Nov 63
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-14-64
MIT APPROVAL
MIT APPROVAL

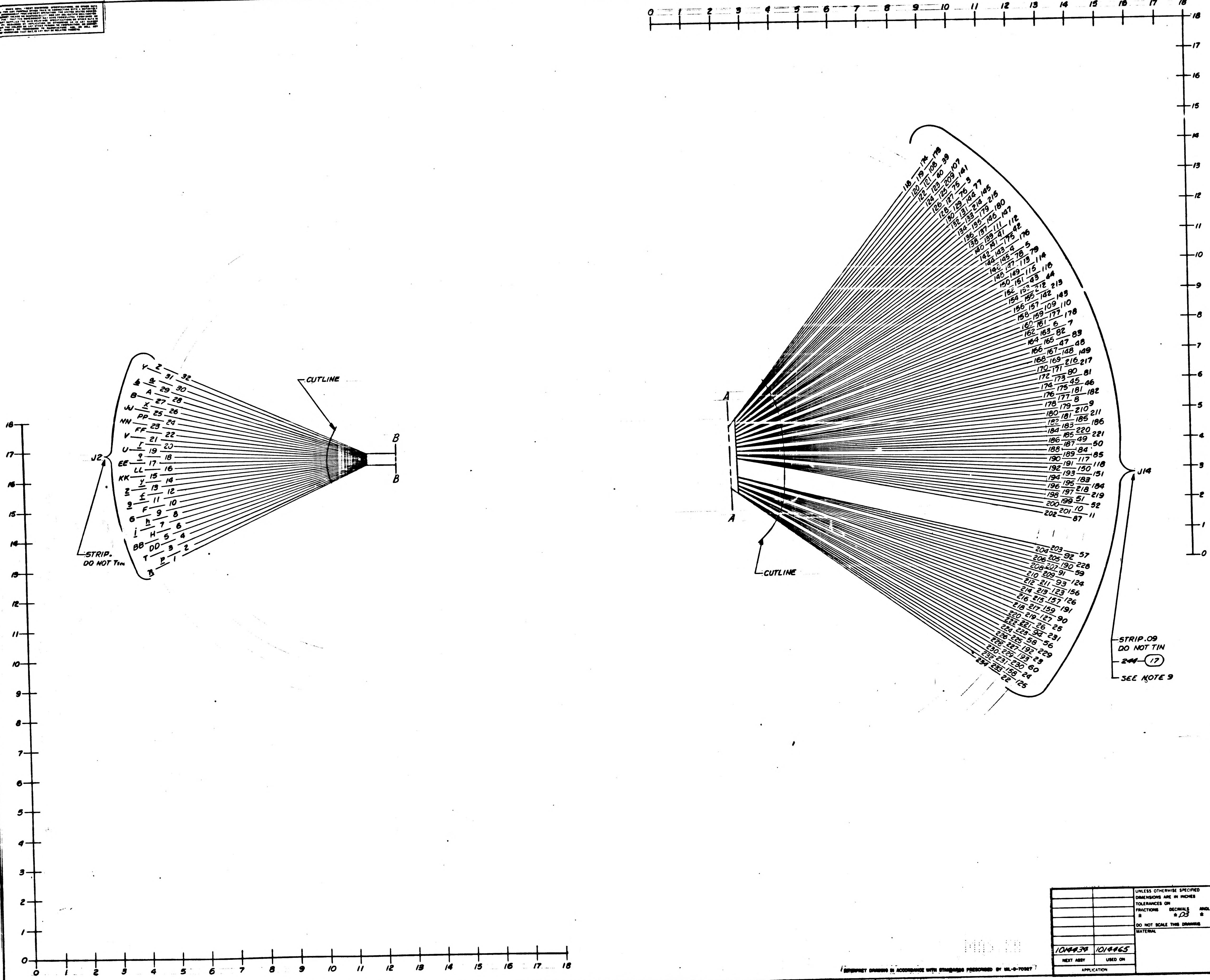
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020125
SCALE 1/1
WT
SHEET 1 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


J2
CUTLINE
B
B
STRIP.
DO NOT TIN
A
A
CUTLINE
J14
STRIP .09
DO NOT TIN
244 (17)
SEE NOTE 9
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/14/64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1014439	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN H. Carlson
CHECKED A. Cappucci
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL 2/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020125
SCALE 1/1
WT
SHEET 2 OF 3

DRAWING IS IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
PHOTOGRAPHIC SCALE ONLY

1050152

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	121	BLK	22	9	37	
	36	BLK	22	9	119	
	118	ORN	22	12	35	
	34	WHT/RED	22	11	120	
	122	BRN	22	16	33	
ATTACH FIND NO.9 LG2.00	123	SHLD			38	ATTACH FIND NO.9 LG 7.75
	93	WHT	22	10	124	
	125	↕	↕	↕	94	
	95	↕	↕	↕	126	
	127	WHT	22	10	96	
	84	WHT	22	15	128	
	83	BLK			129	
	130	WHT	22	15	74	
	131	BLK			73	
	64	WHT	22	15	132	
	63	BLK			133	
	134	WHT	22	15	62	
	135	BLK			61	
	60	WHT	22	15	136	
	59	BLK			137	
	138	WHT	22	15	72	
	139	BLK			71	
	82	WHT	22	15	140	
	81	BLK			141	
	142	WHT	22	15	90	
	143	BLK			89	
	80	WHT	22	15	144	
	79	BLK			145	
	146	WHT	22	15	70	
	147	BLK			69	
	58	WHT	22	15	148	
	57	BLK			149	
	150	WHT	22	15	44	
	151	BLK			43	
	68	WHT	22	15	152	
	67	BLK			153	
	154	WHT	22	15	78	
	155	BLK			77	
	88	WHT	22	15	156	
	87	BLK			157	
	158	WHT	22	15	86	
	159	BLK			85	
	76	WHT	22	15	160	
	75	BLK			161	**
	162	WHT	22	15	66	
	163	BLK			65	
	42	WHT	22	15	164	
	41	BLK			165	
	166	WHT	22	15	40	
	167	BLK			39	
	46	WHT	22	15	168	
	45	BLK			169	
	170	WHT	22	15	50	
	171	BLK			49	
	56	WHT	22	15	172	
	55	BLK			173	
**	174	WHT	22	15	54	
	175	BLK			53	
	48	WHT	22	15	176	
	47	BLK			177	

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	178	WHT	22	15	52	
	179	BLK			51	
	92	WHT	22	15	180	
	91	BLK			181	
	182	WHT	22	15	103	
	183	BLK			102	
	105	WHT	22	15	184	
	104	BLK			185	
	186	WHT	22	15	107	
	187	BLK			106	
	109	WHT	22	15	188	
	108	BLK			189	
	190	WHT	22	15	111	
	191	BLK			110	
	113	WHT	22	15	192	
	112	BLK			193	
	194	WHT	22	15	115	
	195	BLK			114	
	117	WHT	22	15	196	
	116	BLK			197	
	198	WHT	22	15	101	
	199	BLK			100	
	99	WHT	22	10	200	
	201	WHT	22	10	98	
	97	BLK	22	9	202	
	203	WHT	22	10	26	
	15	↕	↕	↕	204	
	205	↕	↕	↕	28	
	16	↕	↕	↕	206	
	207	↕	↕	↕	11	
	25	↕	↕	↕	208	
	209	↕	↕	↕	23	
	18	↕	↕	↕	210	
	211	↕	↕	↕	27	
	29	↕	↕	↕	212	
	213	↕	↕	↕	9	
	22	↕	↕	↕	214	
	215	↕	↕	↕	21	
	13	↕	↕	↕	216	
	217	↕	↕	↕	30	
	2	↕	↕	↕	218	
	219	↕	↕	↕	7	
	1	↕	↕	↕	220	
	221	↕	↕	↕	8	
	5	↕	↕	↕	222	
	223	↕	↕	↕	31	
	24	↕	↕	↕	224	
	225	↕	↕	↕	12	
	20	WHT	22	10	226	
	227	WHT	22	15	17	
	231	BLK			19	
	4	WHT	22	10	228	
	229	↕	↕	↕	6	
	3	↕	↕	↕	230	
	232	↕	↕	↕	10	
	14	WHT	22	10	233	
ATTACH FIND NO.9 LG2.50	234	SHLD			32	ATTACH FIND NO.9 LG2.50

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

INTERNAL GROUND SHEATH			CONN
FROM	TO	LENGTH	FIND NO.
123	161	1	9
161	174	1.5	9

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014434	1014465
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.12 ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Carlson DATE [illegible]
CHECKED A. Cygan 27 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 2/10/64
MIT APPROVAL

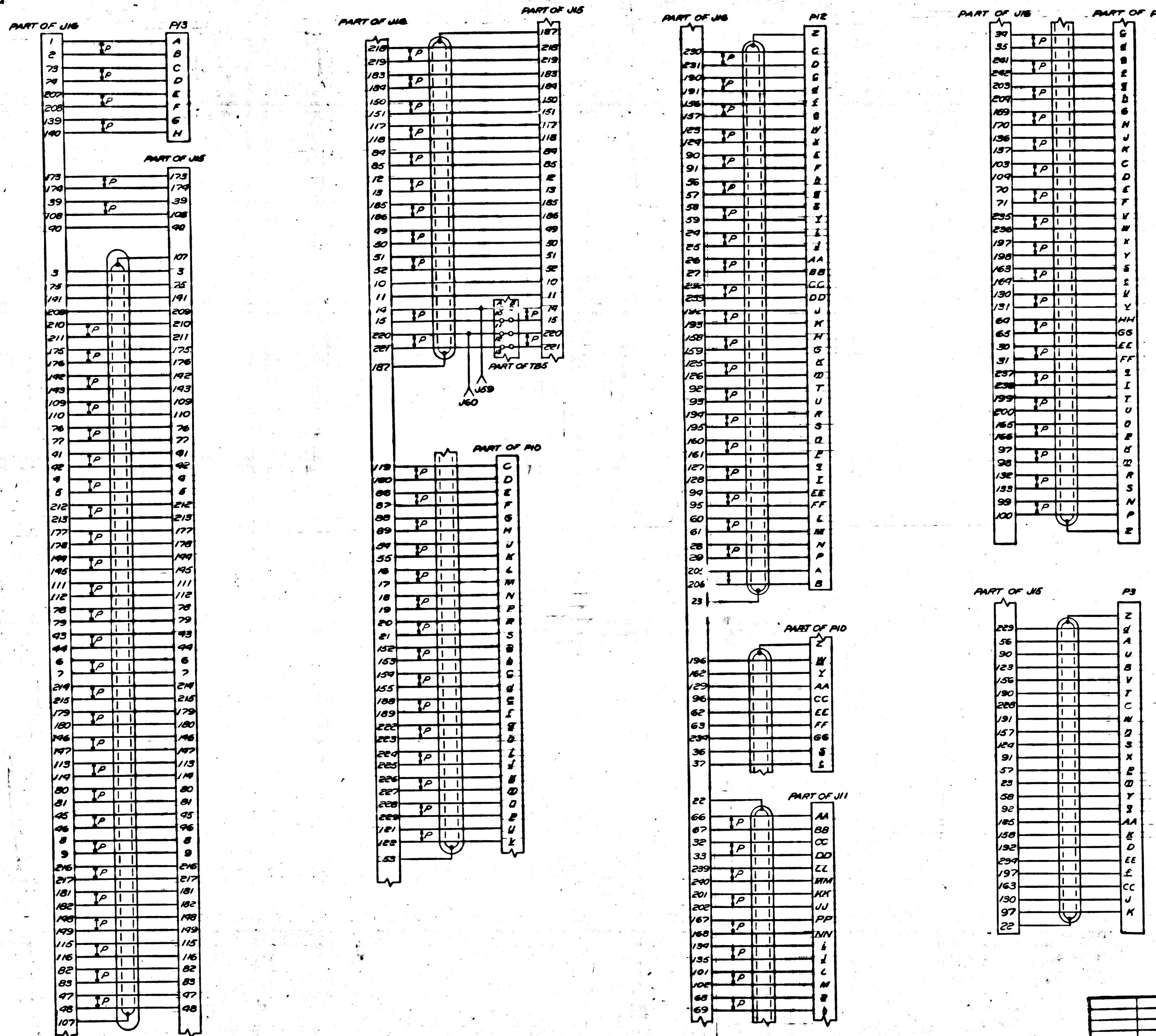
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS, BRANCHED
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020125
SCALE NONE WT
SHEET 3 OF 3

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TC?R		
A	CHANGED PER TDRR 07350 DR Bka... CHK ... APPD ...	11/12/64	KB


PART OF J16
P13
PART OF J15
PART OF J16
PART OF J16
PART OF TB5
J60
J69
PART OF P10
PART OF J16
P12
PART OF P10
PART OF J11
PART OF J16
PART OF P11
PART OF J15
P3
P

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 3/4/64

1020129	1019934
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-497

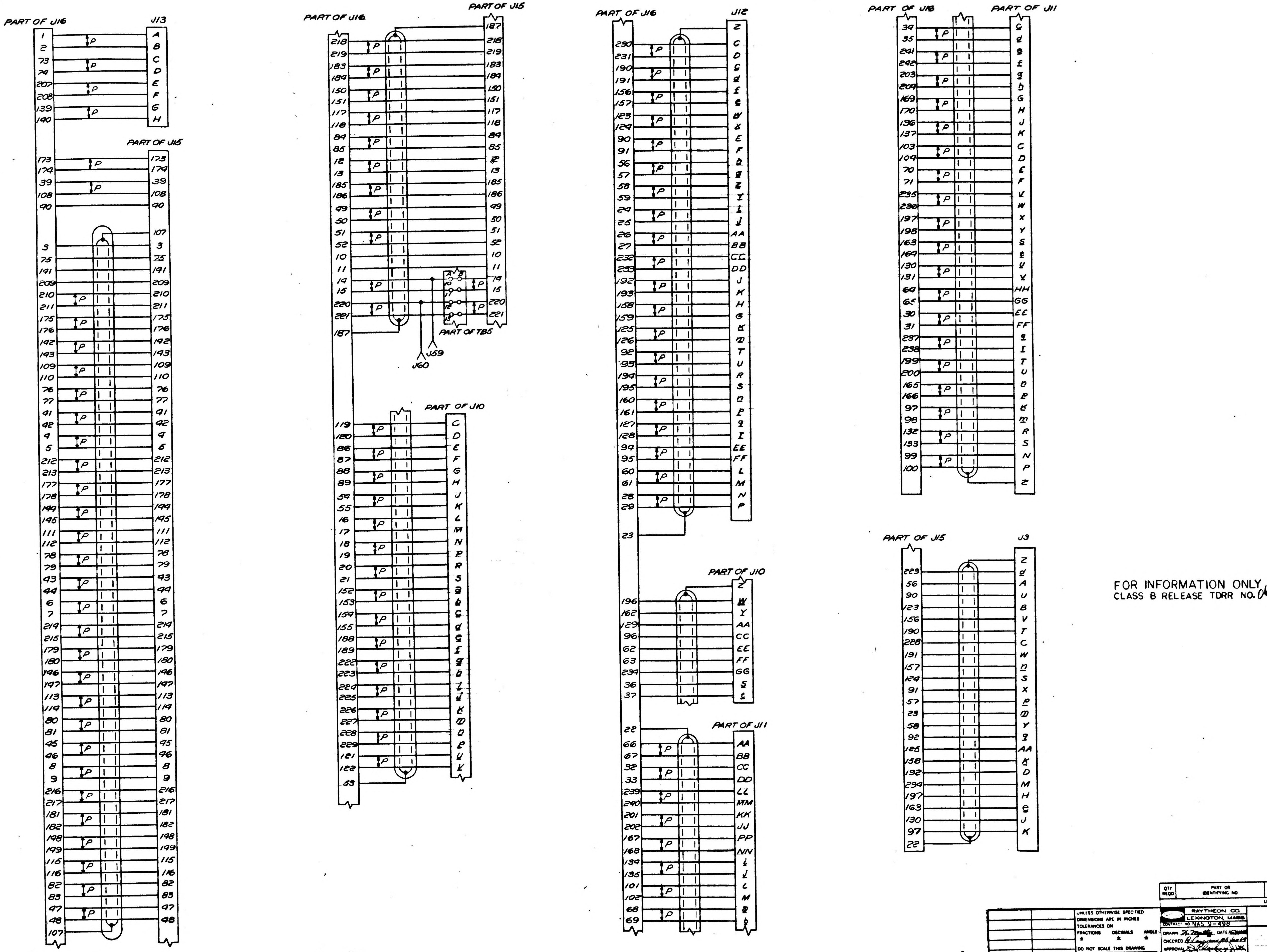
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020126
SCALE NONE WT SHEET 1 OF

MASTER

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR		


PART OF J16
J13
PART OF J15
PART OF J16
PART OF J15
PART OF TB5
J59
J60
PART OF J10
PART OF J16
J12
PART OF J10
PART OF J11
PART OF J16
PART OF J11
PART OF J15
J3
P

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/4/64

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1020129	1014934

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

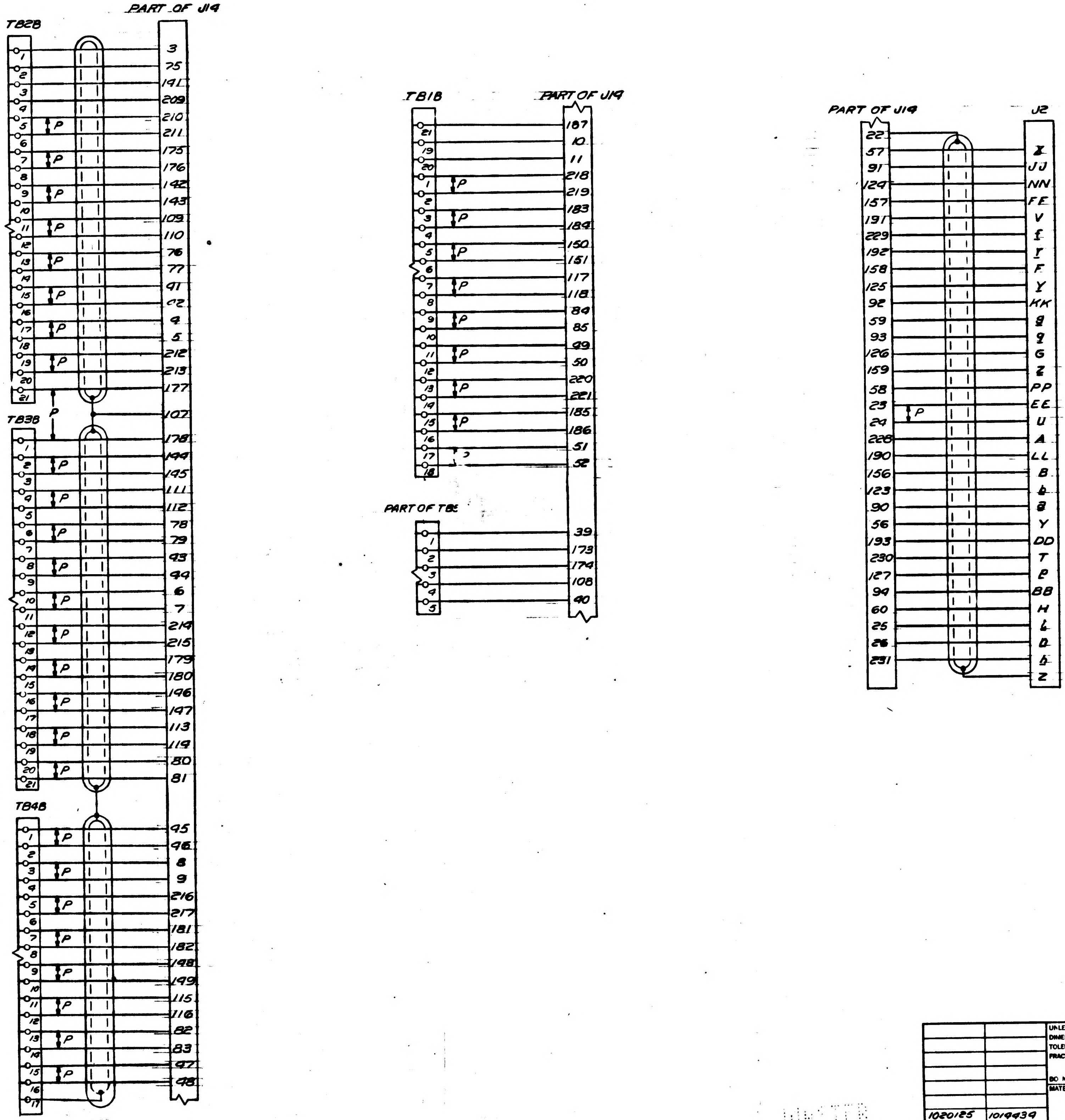
ELECTRICAL SCHEMATIC
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO —
SIZE J
NASA DRAWING NO 1020126
SCALE NONE
WT
SHEET 1 OF 1

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVE
—	CL B RELEASED PER TDRR		


PART OF J14
TB2B
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
P
3
75
191
209
210
211
175
176
142
143
109
110
76
77
41
42
4
5
212
213
177
107
TB3B
178
144
145
111
112
78
79
43
44
6
7
214
215
179
180
196
197
113
119
80
81
TB4B
95
96
8
9
216
217
181
182
148
149
115
116
82
83
47
48
TB1B
PART OF J14
187
10
11
218
219
183
184
150
151
117
118
84
85
49
50
220
221
185
186
51
52
PART OF TB3
39
173
174
108
40
PART OF J14
J2
22
57
91
124
157
191
229
192
158
125
92
59
93
126
159
58
23
24
228
190
156
123
90
56
193
230
127
94
60
25
26
231
X
JJ
NN
FE
V
f
r
F
Y
KK
g
q
G
Z
PP
EE
U
A
LL
B
b
a
Y
DD
T
e
BB
H
L
D
h
Z

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06320 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

1020125	1019439
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Mathy DATE
CHECKED A. Cushman 25 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2-11-64
MIT APPROVAL
MIT APPROVAL 2-10-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ELECTRICAL SCHEMATIC
JUNCTION BOX
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020127
SCALE NONE
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

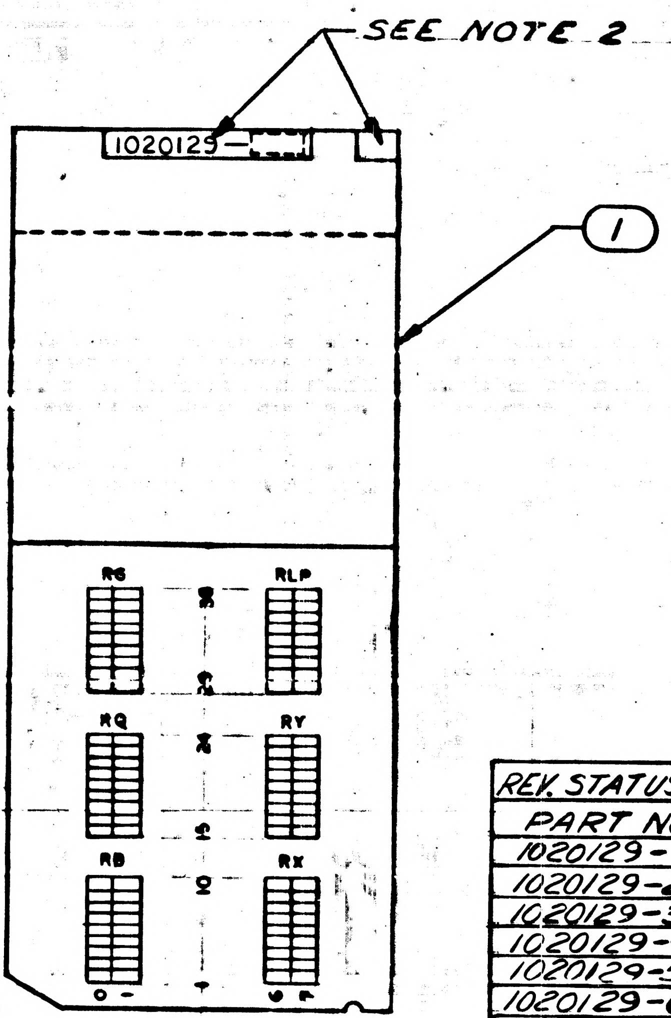
MASTER

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR 06752	3/3/64	
A	CLASS II CHANGE PER RD-R 5889 DR H. Kelley CHK J. C. Joubert APPD	3/24/64	KED
B	CHANGED PER TDRR 10112 DR B Katsuba CHK J. C. Joubert APPD	23 JUN 64	KSB



REV. STATUS OF PARTS	
PART NO.	REV. SYM
1020129-1	—
1020129-2	—
1020129-3	—
1020129-4	—
1020129-5	—
1020129-6	—
1020129-7	—
1020129-8	—
1020129-9	—
1020129-10	—

SHEET 1	SHEET 2
B	B
A	—
—	—

REV. STATUS OF SHEETS

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 06752 DATE 3/3/64

NOTES
1. PUNCH HOLES PER EIA STANDARD RS-292, MEDIA I USING STANDARD MECHANICAL IBM CARD PUNCH NUMBER 010 OR EQUIV IN AREA DESIGNATED BY LETTER A
2. MARK .12 HIGH BLACK CHARACTERS PER ND 1002019 & APPLICABLE REV NO. & DASH NO.

QTY REQD -10	QTY REQD -9	QTY REQD -8	QTY REQD -7	QTY REQD -6	QTY REQD -5	QTY REQD -4	QTY REQD -3	QTY REQD -2	QTY REQD -1	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	1	1	1	1	1	1	1	1	1	1006228	CARD TABULATING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014156	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN F. Rollins DATE 22 Jan
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
INT APPROVAL L. Wald
INT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CARD, PUNCHED
COMPUTER TEST SET

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020129
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06752	3/3/64	
B	CHANGED PER TDRR 10112 DR B Katula CHK J.C. Joubert APPD	23 JAN 64	RES

		COLUMN																													
DASH NO	ROW	1	2	3	4	5	6	7	8	9	10	11 12 13 14	15	16	17	18	19	20	21	22	23	24	25 26 27 28	29	30	31	32	33	34	35	36	37	38
-1	0	A											A											A									
	1	A											A											A									
	6	A											A											A									
	7	A											A											A									
-2	0		A											A											A								
	1		A											A											A								
	6		A											A											A								
	7		A											A											A								
-3	0			A											A											A							
	1			A											A											A							
	6			A											A											A							
	7			A											A											A							
-4	0				A											A											A						
	1				A											A											A						
	6				A											A											A						
	7				A											A											A						
-5	0					A											A											A					
	1					A											A											A					
	6					A											A											A					
	7					A											A											A					
-6	0						A											A											A				
	1						A											A											A				
	6						A											A											A				
	7						A											A											A				
-7	0							A											A											A			
	1							A											A											A			
	6							A											A											A			
	7							A											A											A			
-8	0								A											A											A		
	1								A											A											A		
	6								A											A											A		
	7								A											A											A		
-9	0									A											A											A	
	1									A											A											A	
	6									A											A											A	
	7									A											A											A	
-10	0										A											A											A
	1										A											A											A
	6										A											A											A
	7										A											A											A

SEE NOTE 1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 06752 DATE 3/3/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498

DRAWN DATE 23 Jan 64
CHECKED J Walkowy 24 Jan 64
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 3/2/64
MIT APPROVAL 3/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CARD, PUNCHED
COMPUTER TEST SET

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1020129

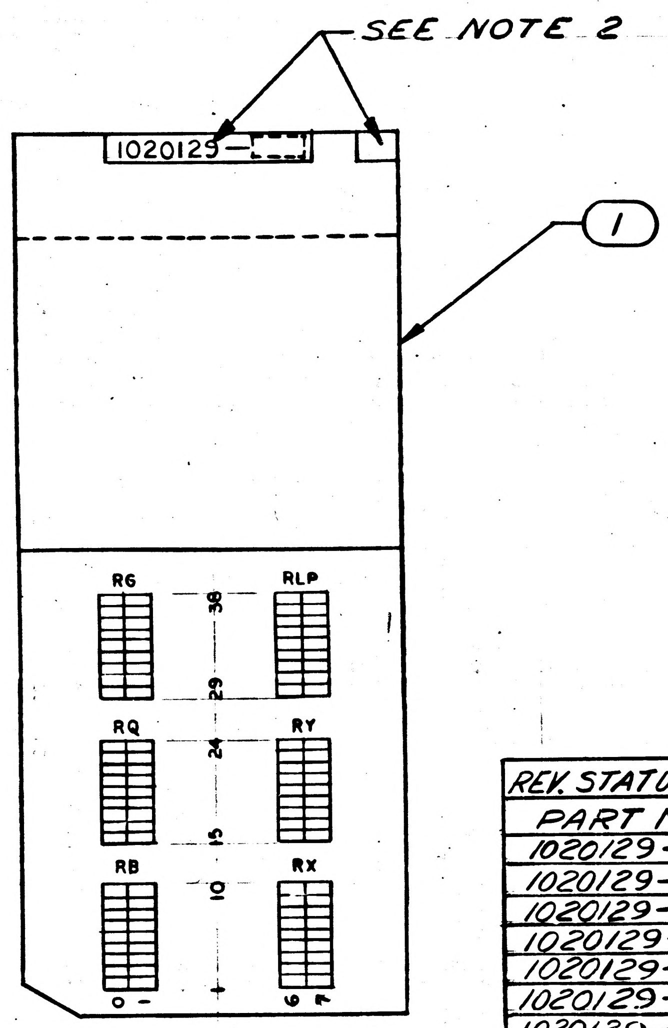
SCALE 1/1 WT SHEET 2 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLB RELEASED PER TDRR 06752	3/3/64	



REV. STATUS OF PARTS	
PART NO.	REV. SYM
1020129-1	—
1020129-2	—
1020129-3	—
1020129-4	—
1020129-5	—
1020129-6	—
1020129-7	—
1020129-8	—
1020129-9	—
1020129-10	—

—	—
SHEET 1	SHEET 2
REV. STATUS OF SHEETS	

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 06752 DATE 3/3/64

NOTES
1. PUNCH HOLES USING STANDARD MECHANICAL IBM CARD PUNCH (.01) OR EQUIV IN AREA DESIGNATED BY LETTER A
2. MARK .12 HIGH BLACK CHARACTERS PER ND 1002019 & APPLICABLE REV NO. & DASH NO.

1	1	1	1	1	1	1	1	1	1	1006228	CARD, TABULATING	1
QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	LIST OF MATERIALS		

1014156	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN F. Pollini DATE 22 JAN 64
CHECKED 24 JAN 64
APPROVAL 20 FEB 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 3/3/64
MIT APPROVAL 2.3.64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CARD, PUNCHED
COMPUTER TEST SET

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 1020129
SCALE 1/1
WT
SHEET 1 OF 2

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 06752	3/3/64	

		COLUMN																															
DASH NO	ROW	1	2	3	4	5	6	7	8	9	10	11 12 13 14	15	16	17	18	19	20	21	22	23	24	25 26 27 28	29	30	31	32	33	34	35	36	37	38
-1	0	A											A											A									
	1	A											A											A									
	6	A											A											A									
	7	A											A											A									
-2	0		A											A											A								
	1		A											A											A								
	6		A											A											A								
	7		A											A											A								
-3	0			A											A											A							
	1			A											A											A							
	6			A											A											A							
	7			A											A											A							
-4	0				A											A											A						
	1				A											A											A						
	6				A											A											A						
	7				A											A											A						
-5	0					A											A											A					
	1					A											A											A					
	6					A											A											A					
	7					A											A											A					
-6	0						A											A											A				
	1						A											A											A				
	6						A											A											A				
	7						A											A											A				
-7	0							A											A											A			
	1							A											A											A			
	6							A											A											A			
	7							A											A											A			
-8	0								A											A											A		
	1								A											A											A		
	6								A											A											A		
	7								A											A											A		
-9	0									A											A											A	
	1									A											A											A	
	6									A											A											A	
	7									A											A											A	
-10	0										A											A											A
	1										A											A											A
	6										A											A											A
	7										A											A											A

SEE NOTE 1

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 06752 DATE 3/3/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	LIST OF MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY	USED ON
1014156	1020002
APPLICATION	

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

RAYTHEON
RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498

DRAWN F Pohlman DATE 23 JAN 64
CHECKED J. Wolkowicz 24 JAN 64
APPROVAL H Mosse JPK 20 FEB 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL D Hazel 3/2/64
MIT APPROVAL 3/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CARD, PUNCHED
COMPUTER TEST SET

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	C	1020129

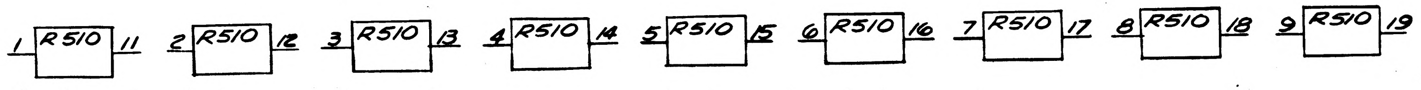
SCALE 1/1 WT SHEET 2 OF 2

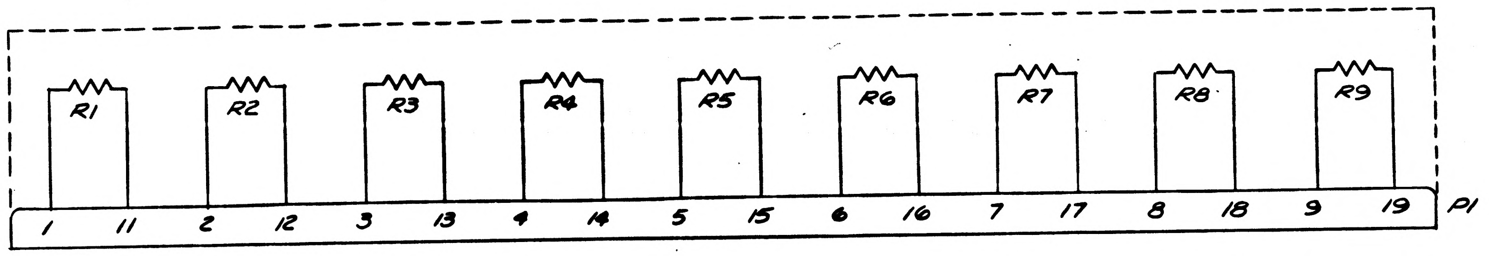
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 06454	2/10/64	JW





FOR INFORMATION ONLY
CLASS B RELEASE PER TDRR NO 06454 DATE 2/10/64

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006760-25	RESISTOR	510Ω	±2%	1/2W
R2	1006760-25	RESISTOR	510Ω	±2%	1/2W
R3	1006760-25	RESISTOR	510Ω	±2%	1/2W
R4	1006760-25	RESISTOR	510Ω	±2%	1/2W
R5	1006760-25	RESISTOR	510Ω	±2%	1/2W
R6	1006760-25	RESISTOR	510Ω	±2%	1/2W
R7	1006760-25	RESISTOR	510Ω	±2%	1/2W
R8	1006760-25	RESISTOR	510Ω	±2%	1/2W
R9	1006760-25	RESISTOR	510Ω	±2%	1/2W
P1	1014038	CONN			

NOTES
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN
PREFIX EACH REFERENCE DESIGNATION WITH
UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH

REF DRAWING
1. MECHANICAL ASSY 1014065-3

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1014065-3	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN David [illegible] DATE 25 Jan 64
CHECKED [illegible] 25 Jan 64
APPROVAL H W Morse JPK 25 Jan
APPROVAL [illegible]
APPROVAL [illegible] 1/31/64
NASA APPROVAL [illegible] 4/14/64
MIT APPROVAL [illegible] 2/18/64
MIT APPROVAL [illegible] 2-18-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR MODULE (510)
ELECTRICAL SCHEMATIC DIAGRAM

CODE IDENT NO —
SIZE D
NASA DRAWING NO 1020130
SCALE NONE
WT
SHEET 1 OF 1

MASTER

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

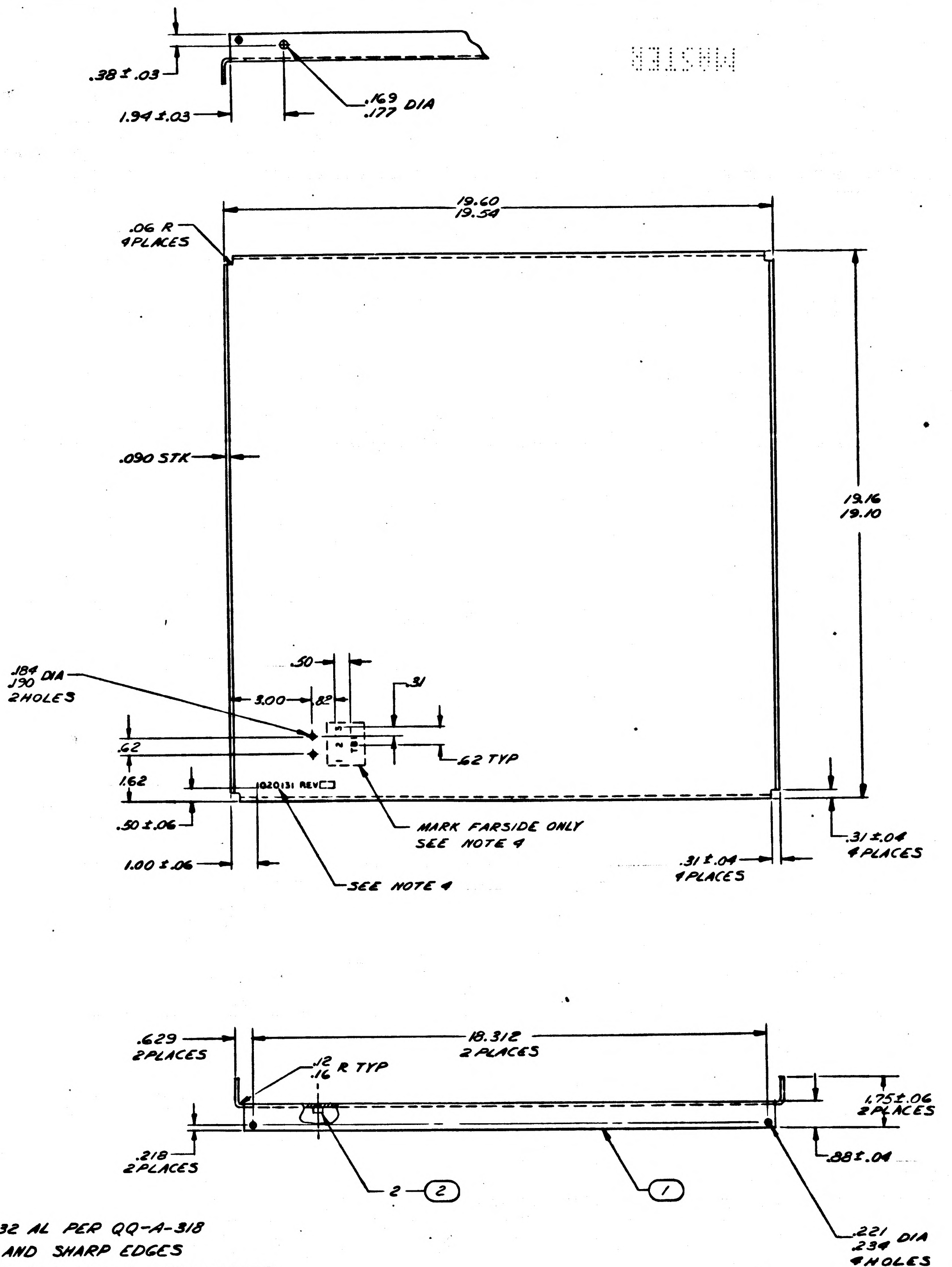
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1020130

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

ANY USE OF THIS DOCUMENT FOR OTHER THAN GOVERNMENTAL PURPOSES IS SUBJECT TO PRIOR WRITTEN CONSENT OF RAYTHEON CO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 06455	2/11/64	


.38 ± .03
1.94 ± .03
.169 .177 DIA
19.60 19.54
.06 R 4 PLACES
.090 STK
19.16 19.10
.184 .190 DIA 2 HOLES
.50
3.00
.82
.31
.62
.62 TYP
1.62
1020131 REV
.50 ± .06
1.00 ± .06
MARK FARSIDE ONLY SEE NOTE 4
SEE NOTE 4
.31 ± .04 4 PLACES
.31 ± .04 4 PLACES
.629 2 PLACES
18.312 2 PLACES
.12 .16 R TYP
1.75 ± .06 2 PLACES
.88 ± .04
.218 2 PLACES
2 — 2
1
.221 .234 DIA 4 HOLES

NOTES

1. MATL: 5052-H32 AL PER QQ-A-318
2. REMOVE BURRS AND SHARP EDGES
3. CHROMATE FILM PER MIL-C-5541, EXCEPT TO BE ELECTRICALLY CONDUCTIVE
4. MARK .12 HIGH BLACK CHARACTERS AND ADD APPLICABLE REVISION LETTER PER ND1002019

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO 06455 DATE 2/11/64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1006989-11	INSERT	2
1	1020131-1	PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
10M156	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 .016 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE
HEAT TREATMENT
FINAL FINISH SEE NOTE

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN E. Pohlman DATE
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL 2/11/64
MIT APPROVAL
MIT APPROVAL 2/11/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, BAFFLE, TERMINAL BOARD
COMPUTER TEST SET

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020131
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

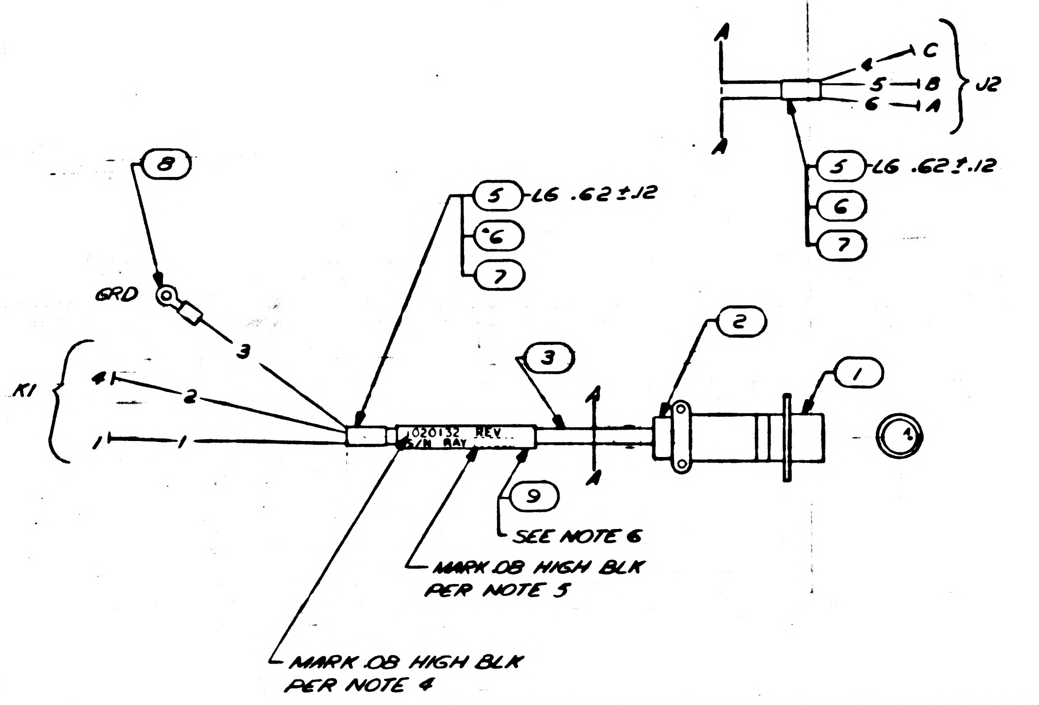
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

1020131

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASE PER TDRR		
A	CHANGED PER TDRR 08025 DR J.P. Leonard CHK APPD	6 MAY 64	NEB

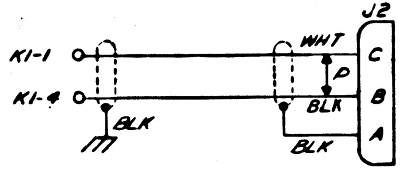


FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06621 DATE 25 Feb 64

ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	20	3	4	
	2	BLK			5	
ATTACH FIND NO.4 LG 2.70	3	SHIELD			6	ATTACH FIND NO.4 LG 1.40

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-23053, CLASS I, COLOR BLK, FOR FIND NO.5, SIZE NO.8
3. * DENOTES LENGTH IN FEET
4. MARK PER ND1002019
5. MARK SER NO. PER ND1002023
6. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE



ELECTRICAL SCHEMATIC

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	1	1014472-1	BAND MARKER, CABLE	9
	1	MS25036-49	TERMINAL, LUG	8
	2	1000242-5	FERRULE, ELECTRICAL COND	7
	2	1000243-9	FERRULE, ELECTRICAL COND	6
*	.10	SEE NOTE 2	SLEEVING	5
*	.60	MIL-W-16878/4, TYPE E 20 BLK	WIRE, ELECTRICAL	4
*	.80	ND1002181-4 TYPE 2 CL4	WIRE, ELECTRICAL	3
	1	MS39056-2	BUSHING, SLEEVE	2
	1	MS3128F-10-6P	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014142	
1014141	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. Glenn DATE
CHECKED 12 Feb 64
APPROVAL H.W. 13 FEB 64
APPROVAL
APPROVAL 2-17-64
NASA APPROVAL 4/21/64
UNIT APPROVAL 25 Feb 64
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS
COMPUTER TEST SET

CODE IDENT NO.	SIZE	NASA DRAWING NO.
——	D	1020132

SCALE 1/1 WT SHEET 1 OF 1

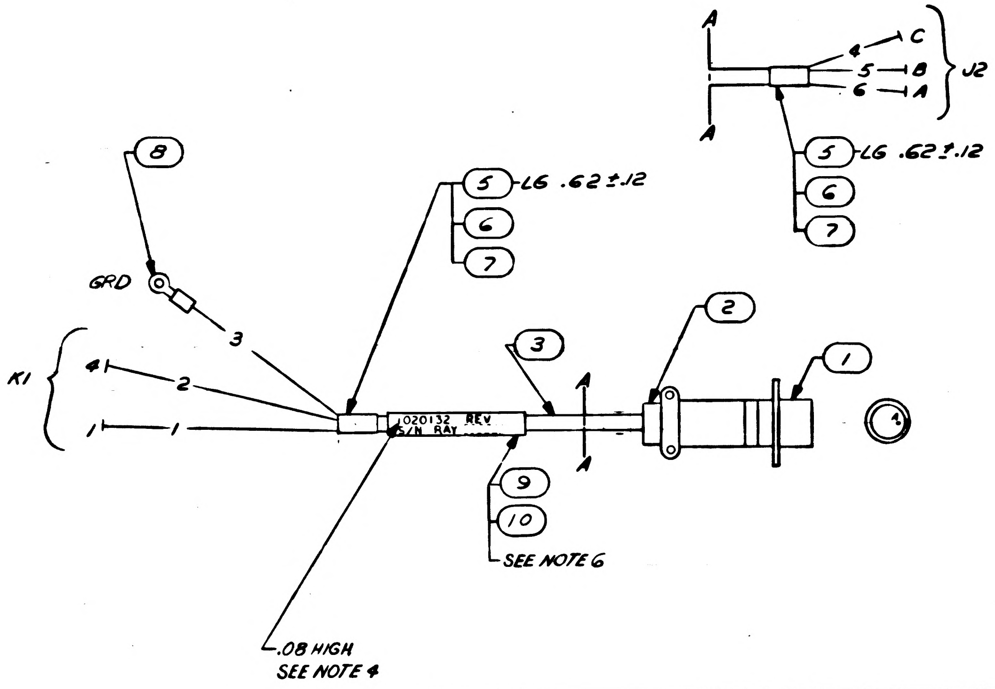
1020132

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASE PER TDRR 06672		
A	CHANGED PER TDRR 08025 DR J.P Leonard CHK APPD	6 MAY 64	
B	UPGRADE TO CLASS A WITH CHANGE PER TDRR 17950 DR A.J. Bison CHK APPD Marino	2 APR 65	



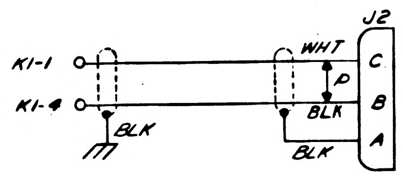
ASSEMBLY INFORMATION CHART

FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	20	3	4	
	2	BLK			5	
ATTACH FIND NO.4 LG 2.70	3	SHIELD			6	ATTACH FIND NO.4 LG 1.40

NOTES
1. FOR FABRICATION SEE ND1002032
2. MIL-I-23053, CLASS I, COLOR BLK, FOR FIND NO.5, SIZE NO. 250 ID
3. * DENOTES LENGTH IN FEET
4. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 & ND1002023 USING BLACK INK 1006256-001

~~5. MARK SER NO. PER ND1002023~~

6. BOND USING FIND 10 APPROX. AS SHOWN
7. CRIMP PER ND1002206



ELECTRICAL SCHEMATIC

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006253	ADHESIVE	10
1	1014472-1A	BAND MARKER, CABLE	9
1	MS25036-49	TERMINAL, LUG	8
2	1000242-5	FERRULE, ELECTRICAL COND	7
2	1000243-9	FERRULE, ELECTRICAL COND	6
* .10	SEE NOTE 2	SLEEVING	5
* .60	MIL-W-16878/4, TYPE E 20 BLK	WIRE, ELECTRICAL	4
* .80	MIL-C-27500, 20, D, 2, S, 6	WIRE, ELECTRICAL, BLK, WHT	3
1	MS39056-2	BUSHING, SLEEVE	2
1	MS3128F-10-6P	CONNECTOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1014142	
1014141	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R D Gh DATE
CHECKED 12 FEB 64
APPROVAL H.W. Mac
APPROVAL D.L.O.
APPROVAL 2 17 64
NASA APPROVAL 4/4/64
MIT APPROVAL 25 Feb 64
MIT APPROVAL 2-24-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

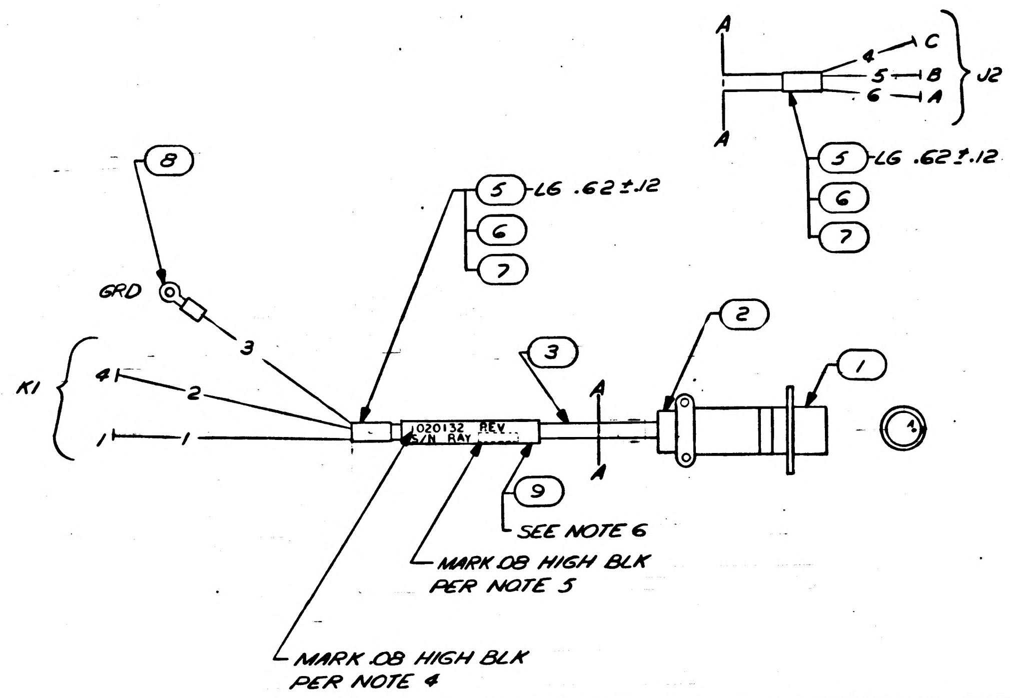
WIRING HARNESS
COMPUTER TEST SET

CODE IDENT NO —
SIZE D
NASA DRAWING NO 1020132
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITE RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

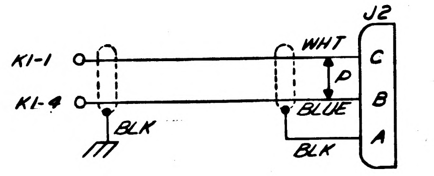
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
-	CLASS B RELEASE PER TDRR		



ASSEMBLY INFORMATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	20	3	4	
	2	BLUE			5	
ATTACH FIND NO.4 LG 2.70	3	SHIELD			6	ATTACH FIND NO.4 LG 1.40

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 06672 DATE 25 Feb 64

NOTES
1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032
2. MIL-I-23053, CLASS I, COLOR BLK, FOR FIND NO.5, SIZE NO.8
3. * DENOTES LENGTH IN FEET
4. MARK PER ND1002019
5. MARK SER NO. PER ND1002023
6. BOND FIND NO.9 USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE



ELECTRICAL SCHEMATIC

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	1	1014472-1	BAND MARKER, CABLE	9
	1	MS25036-49	TERMINAL, LUG	8
	2	1000242-5	FERRULE, ELECTRICAL COND	7
	2	1000243-9	FERRULE, ELECTRICAL COND	6
*	.10	SEE NOTE 2	SLEEVING	5
*	.60	MIL-W-16878/4, TYPE E 20 BLK	WIRE, ELECTRICAL	4
*	.80	ND1002181-4 TYPE 2, CL4	WIRE, ELECTRICAL	3
	1	MS39056-2	BUSHING, SLEEVE	2
	1	MS3128F-10-6P	CONNECTOR	1

LIST OF MATERIALS

MASTER

1014142	
1014141	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN R.D. Gh... DATE 11 Feb 64
CHECKED 12 Feb 64
APPROVAL H.W. ... 13 FEB 64
APPROVAL D.P. O'... 14 Feb 64
APPROVAL J.L. Free... 2-17-64
NASA APPROVAL 2/25/64
MIT APPROVAL 25 Feb 64
MIT APPROVAL 2-24-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS
COMPUTER TEST SET

CODE IDENT NO. —— SIZE D NASA DRAWING NO. 1020132
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

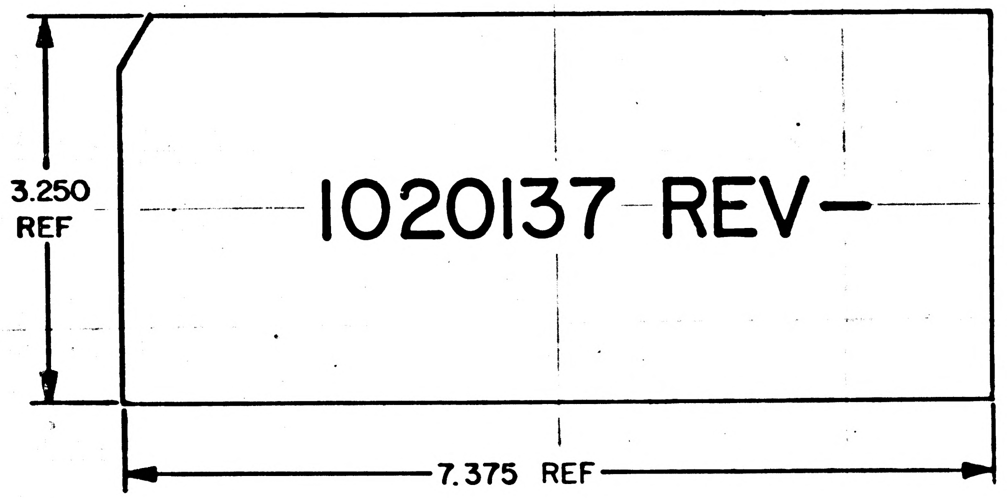
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER. AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
—	CL B RELEASE PER TDRR 07360	3/31/64	

DECK X

NO OF CARDS 71



REFERENCE DRAWINGS

SCHEMATICS 1014488

FOR INFORMATION ONLY

CLASS b RELEASE TDRR NO DATE

NOTE:

NEGATIVE SHALL BE SCREENED TO 50% OF BLACK

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
3/17/64
NASA APPROVAL E. C.
MIT APPROVAL 3/31/64
MIT APPROVAL 3-30

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE WRAP MACHINE CARDS
COMPUTER TEST SET
INTERCONNECTION PLATE
PLATE ASSEMBLY A1

CODE IDENT NO.	SIZE	NASA DRAWING NO.
-	B	1020137

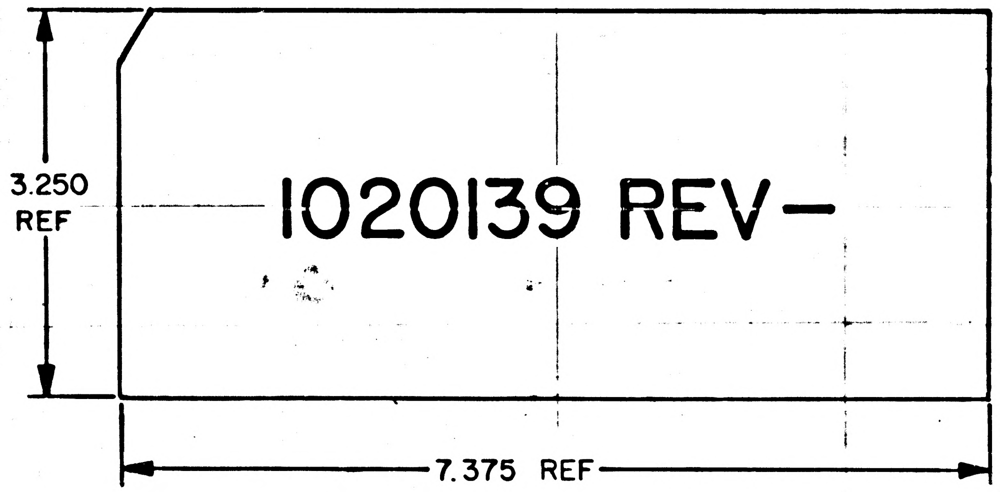
SCALE NONE WT SHEET OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
—	CL B RELEASE PER TDRR 07360	3/3/64	

DECK Z

NO OF CARDS 215



REFERENCE DRAWINGS

SCHEMATICS 1014488

FOR INFORMATION ONLY

CLASS B RELEASE TDRR NO DATE

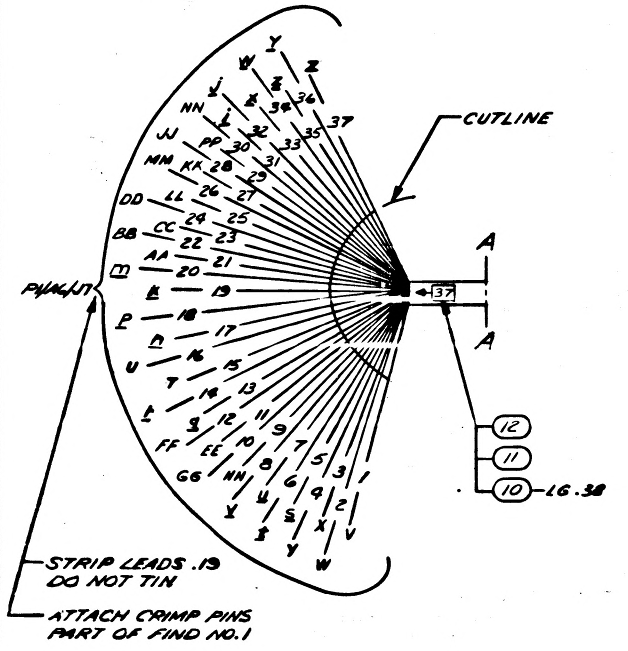
NOTE:

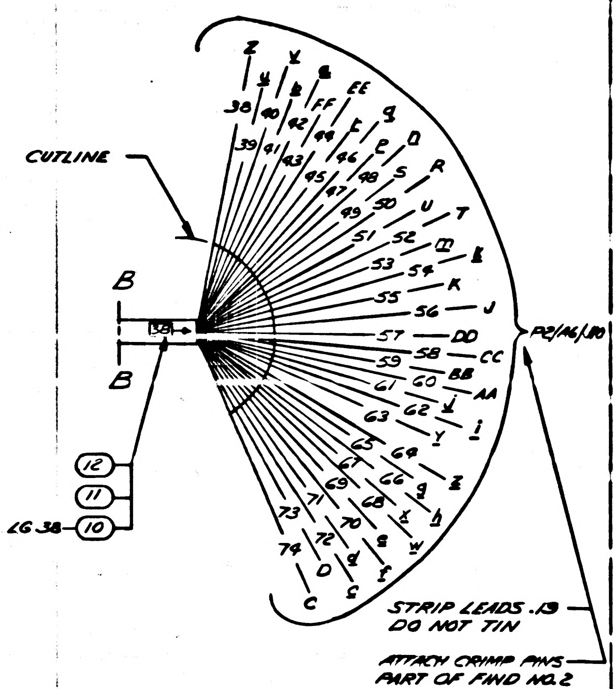
NEGATIVE SHALL BE SCREENED TO 50% OF BLACK

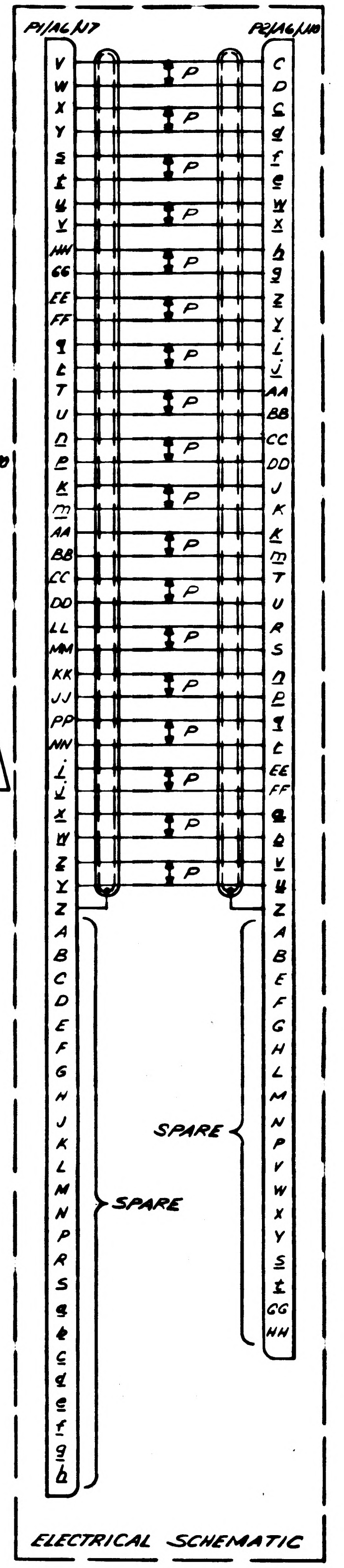
RAYTHEON CO. LEXINGTON, MASS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
CONTRACT NO. NAS-9-498	
DRAWN DATE ~~[illegible]~~ CHECKED APPROVAL APPROVAL 3/13/64	WIRE WRAP MACHINE CARDS COMPUTER TEST SET INTERCONNECTION PLATE PLATE ASSEMBLY A3
NASA APPROVAL 3/3/64 MIT APPROVAL 3/31/64 MIT APPROVAL 3-30-64	CODE IDENT NO. — SIZE B NASA DRAWING NO. 1020139 SCALE NONE WT SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 08028	4/23/64	
A	CHANGED PER TDRR 10086 DR 2 CHK APPD	24 JUN 64	

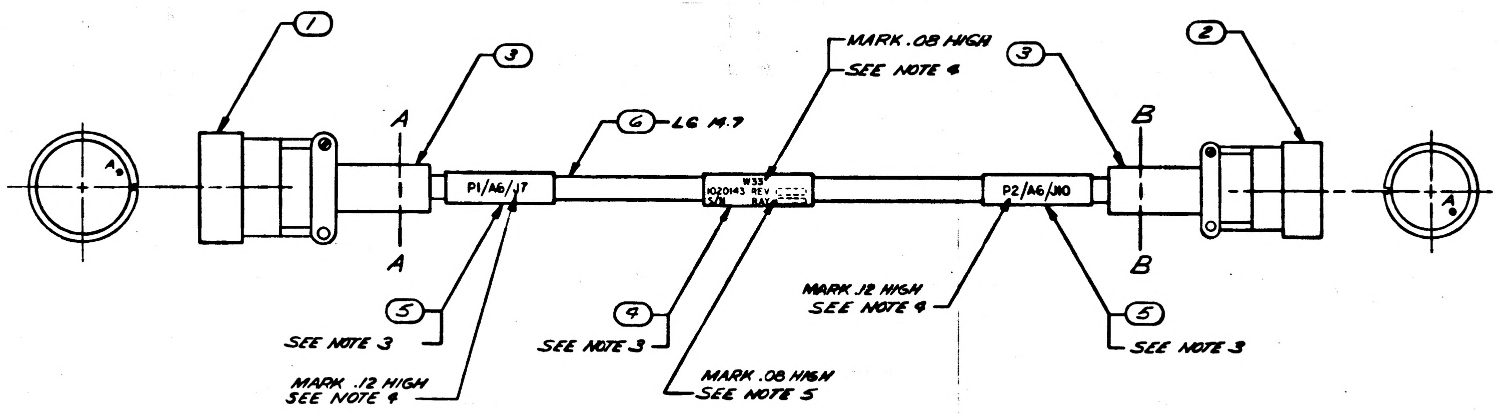
ASSEMBLY DESIGNATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	22	7	74	
	2	BLK			73	
	3	WHT	22	7	72	
	4	BLK			71	
	5	WHT	22	7	70	
	6	BLK			69	
	7	WHT	22	7	68	
	8	BLK			67	
	9	WHT	22	7	66	
	10	BLK			65	
	11	WHT	22	7	64	
	12	BLK			63	
	13	WHT	22	7	62	
	14	BLK			61	
	15	WHT	22	7	60	
	16	BLK			59	
	17	WHT	22	7	58	
	18	BLK			57	
	19	WHT	22	7	56	
	20	BLK			55	
	21	WHT	22	7	54	
	22	BLK			53	
	23	WHT	22	7	52	
	24	BLK			51	
	25	WHT	22	7	50	
	26	BLK			49	
	27	WHT	22	7	48	
	28	BLK			47	
	29	WHT	22	7	46	
	30	BLK			45	
	31	WHT	22	7	44	
	32	BLK			43	
	33	WHT	22	7	42	
	34	BLK			41	
	35	WHT	22	7	40	
	36	BLK			39	
	37	SHIELD		9	38	**


P1/A6/J17
CUTLINE
A
A
37
12
11
10 LG .38
STRIP LEADS .13 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO.1


CUTLINE
B
B
38
12
11
LG .38 10
P2/A6/J10
STRIP LEADS .13 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO.2


P1/A6/J17
P2/A6/J10
P
SPARE
SPARE

ELECTRICAL SCHEMATIC


1
3
A
A
6 LG 14.7
MARK .08 HIGH SEE NOTE 4
P1/A6/J17
W33 1020143 REV
P2/A6/J10
3
B
B
2
5 SEE NOTE 3
MARK .12 HIGH SEE NOTE 4
4 SEE NOTE 3
MARK .08 HIGH SEE NOTE 5
MARK .12 HIGH SEE NOTE 4
5 SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 08028 DATE 4/23/64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032.
2. MIL-I-631, TYPE F, FORM U, GRADE a, CLASS 1, CATEGORY 1 FOR FIND NO.6 AWG 5/8.
3. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
4. MARK BLACK CHARACTERS PER ND 1002019
5. MARK BLACK CHARACTERS PER ND 1002023
6. MIL-I-23053, CLASS 1, COLOR BLACK FOR FIND NO. 10 SIZE NO. 5/8.
7. ** DENOTES ATTACH FIND NO. 8. LG 2.00
8. QQ-B-575 FOR FIND NO. 9 BRAID SIZE 1/2.

* DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	2	1000242-33	FERRULE, ELEC COND	12
	2	1000243-37	FERRULE, ELEC COND	11
*	0.1	SEE NOTE 6	INSULATION, SLEEVING	10
	14.7	SEE NOTE 8	WIRE, BRAID	9
	5.0	MIL-W-16878/4, E22, BLK	WIRE, ELEC	8
*	27	1014391-11	WIRE, ELEC, TWISTED PAIR	7
	14.7	SEE NOTE 2	SLEEVING	6
	2	1014472-4A	BAND MARKER CABLE	5
	1	1014472-4	BAND MARKER, CABLE	4
	2	AN3420-16A	BUSHING	3
	1	MS3126F-22-55SX	CONNECTOR, PLUG	2
	1	MS3126F-24-61S	CONNECTOR PLUG	1

LIST OF MATERIALS

1019965	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 30 MAR 64
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W33
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 1020143
SCALE 1/1 WT SHEET 1 OF 1

MASTER

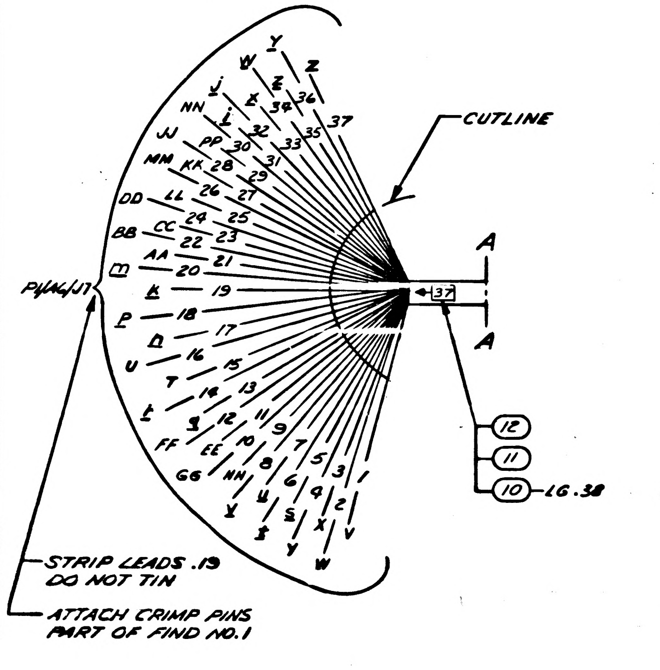
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

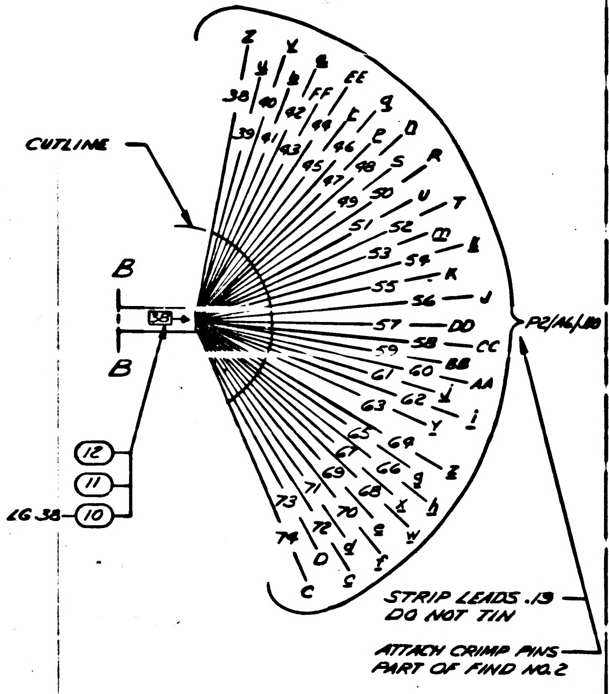
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 08628	4/22/64	
A	CHANGED PER TDRR 10086 DR 2 [illegible] CHK [illegible] APPD	24 JUN 64	
B	CHANGED PER TDRR NO 11753 DR: [illegible] CHK: JEJ APPD: [illegible]	21 AUG 64	NCB

ASSEMBLY DESIGNATION CHART

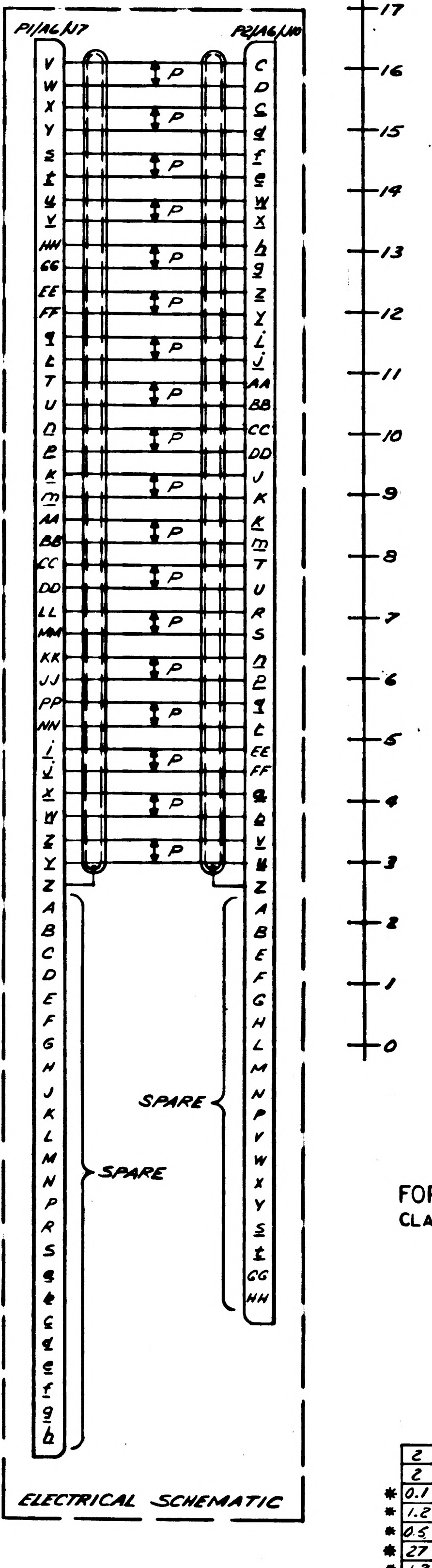
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	22	7	74	
	2	BLK			73	
	3	WHT	22	7	72	
	4	BLK			71	
	5	WHT	22	7	70	
	6	BLK			69	
	7	WHT	22	7	68	
	8	BLK			67	
	9	WHT	22	7	66	
	10	BLK			65	
	11	WHT	22	7	64	
	12	BLK			63	
	13	WHT	22	7	62	
	14	BLK			61	
	15	WHT	22	7	60	
	16	BLK			59	
	17	WHT	22	7	58	
	18	BLK			57	
	19	WHT	22	7	56	
	20	BLK			55	
	21	WHT	22	7	54	
	22	BLK			53	
	23	WHT	22	7	52	
	24	BLK			51	
	25	WHT	22	7	50	
	26	BLK			49	
	27	WHT	22	7	48	
	28	BLK			47	
	29	WHT	22	7	46	
	30	BLK			45	
	31	WHT	22	7	44	
	32	BLK			43	
	33	WHT	22	7	42	
	34	BLK			41	
	35	WHT	22	7	40	
	36	BLK			39	
**	37	SHIELD			38	**



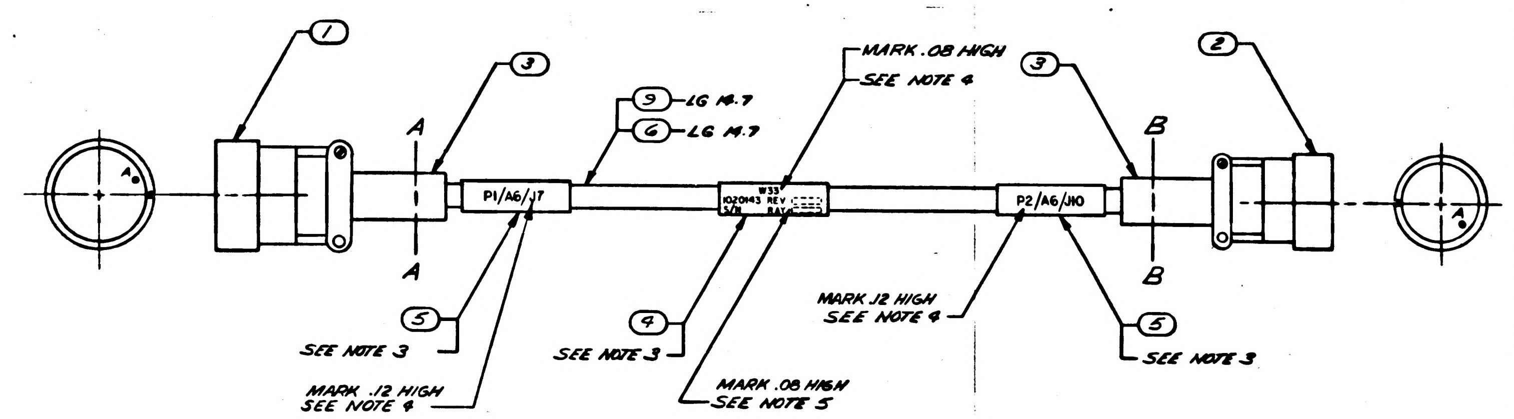
P1/A6/J7
CUTLINE
A
A
37
12
11
10
LG .38
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 1



P2/A6/J10
CUTLINE
B
B
38
12
11
10
LG .38
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO. 2



P1/A6/J7
P2/A6/J10
P
SPARE
SPARE
ELECTRICAL SCHEMATIC



1
2
3
3
A
A
B
B
P1/A6/J7
P2/A6/J10
9
6
LG 14.7
LG 14.7
MARK .08 HIGH
SEE NOTE 4
W33
1020143 REV
S/N RAY
5
SEE NOTE 3
MARK .12 HIGH
SEE NOTE 4
4
SEE NOTE 3
MARK .08 HIGH
SEE NOTE 5
MARK .12 HIGH
SEE NOTE 4
5
SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 08628 DATE 4/22/64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032.
2. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I FOR FIND NO. 6 AWG 5/8.
3. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
4. MARK BLACK CHARACTERS PER ND 1002019
5. MARK BLACK CHARACTERS PER ND 1002023
6. MIL-I-23053, CLASS 1, COLOR BLACK FOR FIND NO. 10 SIZE NO. 5/8.
7. ** DENOTES ATTACH FIND NO. 8. LG 2.00
8. QQ-B-575 FOR FIND NO. 9 BRAID SIZE 1/2.

* DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	2	1000242-33	FERRULE, ELEC COND	12
	2	1000243-37	FERRULE, ELEC COND	11
*	0.1	SEE NOTE 6	INSULATION, SLEEVING	10
*	1.2	SEE NOTE 8	WIRE, BRAID	9
*	0.5	MIL-W-16878/4, E22, BLK	WIRE, ELEC	8
*	27	1019391-11	WIRE, ELEC, TWISTED PAIR	7
*	1.2	SEE NOTE 2	SLEEVING	6
	2	1014972-4A	BAND MARKER, CABLE	5
	1	1014972-4	BAND MARKER, CABLE	4
	2	AN3420-16A	BUSHING	3
	1	MS3126F-22-55SX	CONNECTOR, PLUG	2
	1	MS3126F-24-61S	CONNECTOR, PLUG	1

LIST OF MATERIALS

1019965	1020002
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE 30 [illegible] 64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 64

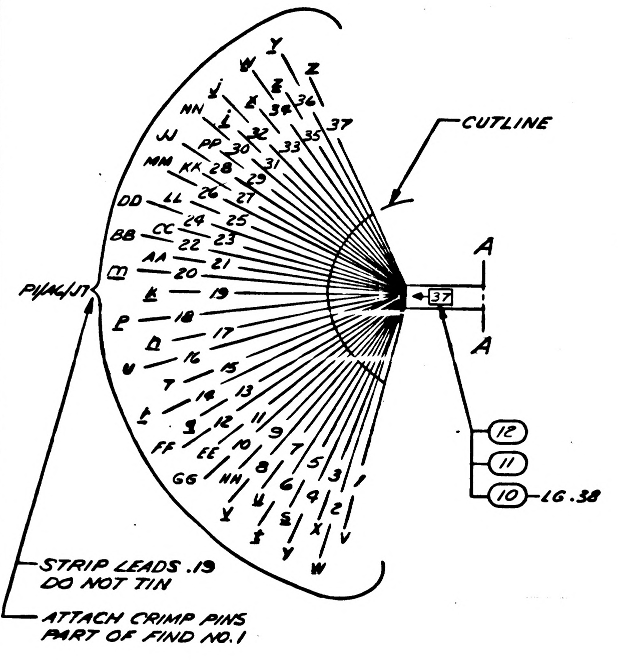
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

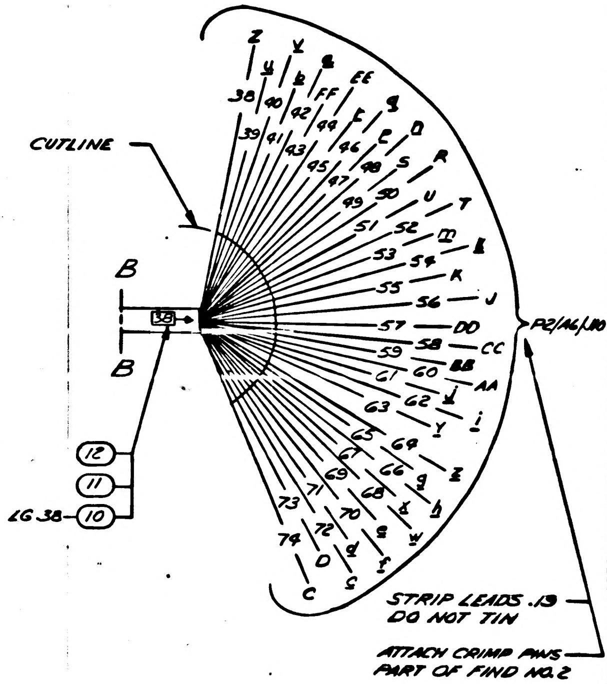
CABLE ASSEMBLY
W33
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020143
SCALE 1/1
WT
SHEET 1 OF 1

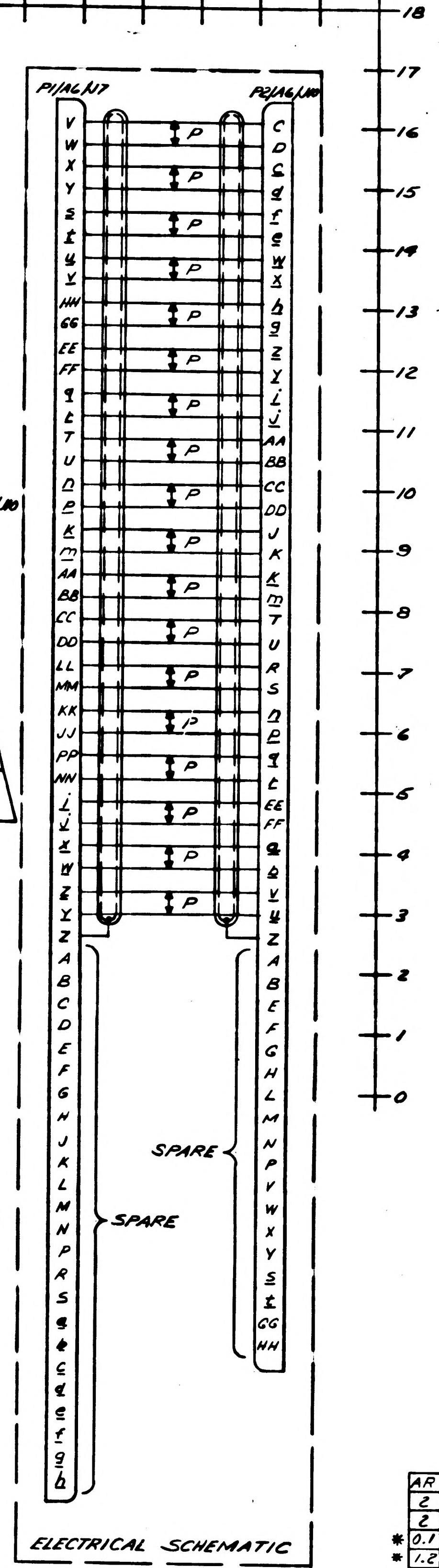
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

ASSEMBLY DESIGNATION CHART						
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	22	7	74	
	2	BLK			73	
	3	WHT	22	7	72	
	4	BLK			71	
	5	WHT	22	7	70	
	6	BLK			69	
	7	WHT	22	7	68	
	8	BLK			67	
	9	WHT	22	7	66	
	10	BLK			65	
	11	WHT	22	7	64	
	12	BLK			63	
	13	WHT	22	7	62	
	14	BLK			61	
	15	WHT	22	7	60	
	16	BLK			59	
	17	WHT	22	7	58	
	18	BLK			57	
	19	WHT	22	7	56	
	20	BLK			55	
	21	WHT	22	7	54	
	22	BLK			53	
	23	WHT	22	-	52	
	24	BLK			51	
	25	WHT	22	7	50	
	26	BLK			49	
	27	WHT	22	7	48	
	28	BLK			47	
	29	WHT	22	7	46	
	30	BLK			45	
	31	WHT	22	7	44	
	32	BLK			43	
	33	WHT	22	7	42	
	34	BLK			41	
	35	WHT	22	7	40	
	36	BLK			39	
**	37	SHIELD			38	**

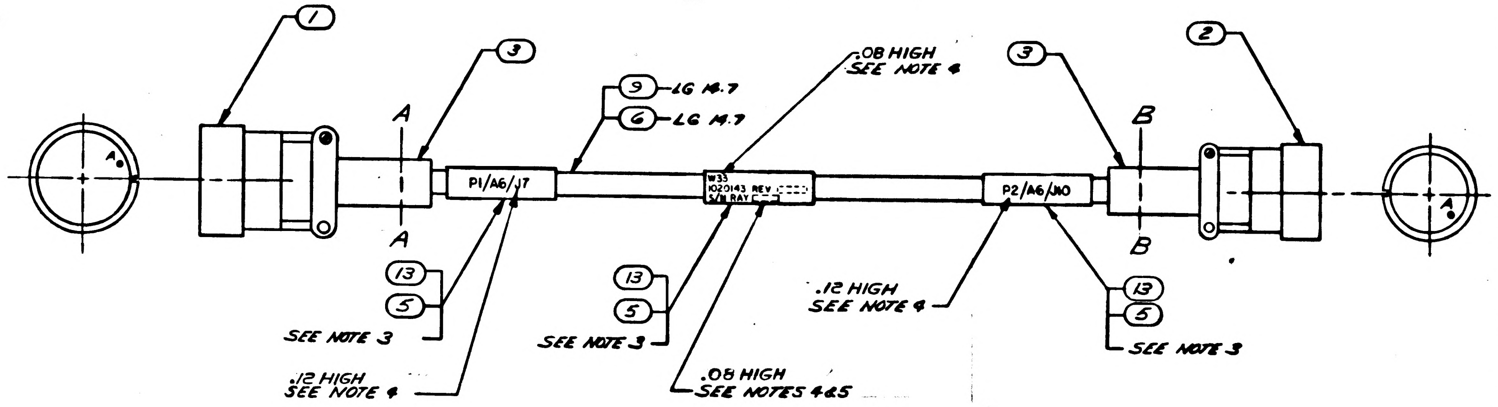

CUTLINE
P1/A6/J17
A
37
12
11
10
LG.38
STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO.1


CUTLINE
B
38
12
11
10
LG.38
P2/A6/J10
STRIP LEADS .19 DO NOT TIN
ATTACH CRIMP PINS PART OF FIND NO.2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASED PER TDRR 08628	4/23/64	
A	CHANGED PER TDRR 10086 DR CHK APPD	24 JUN 64	
B	CHANGED PER TDRR NO. 11753 DR CHK: APPD:	21 AUG 64	
C	UPGRADE TO CLASS A WITH CHANGE PER TDRR 18940 DR CHK APPD	28 MAY 65	


P1/A6/J17
P2/A6/J10
P
SPARE
SPARE

ELECTRICAL SCHEMATIC


1
3
A
A
9
LG 14.7
6
LG 14.7
.08 HIGH SEE NOTE 4
P1/A6/J17
W33 1020143 REV S/N RAY
P2/A6/J10
3
2
B
B
13
5
SEE NOTE 3
.12 HIGH SEE NOTE 4
13
5
SEE NOTE 3
.08 HIGH SEE NOTES 4&5
.12 HIGH SEE NOTE 4
13
5
SEE NOTE 3

NOTES

1. FOR FABRICATION SEE ND1002032
2. MIL-I-631, TYPE F, FORM U, GRADE A, CLASS 1, CATEGORY 1 FOR FIND NO.6 AWG 5/8.
3. BOND USING FIND 13 APPROX AS SHOWN
4. MARK GOTHIC CHARACTERS AS SHOWN PER ND1002019 USING BLACK INK 1006256-001
5. SERIALIZE PER ND1002023
6. MIL-I-23053, CLASS 1, COLOR BLACK FOR FIND NO. 10 SIZE NO. 5/8.
7. ** DENOTES ATTACH FIND NO. 8. LG 2.00
8. QQ-B-575 FOR FIND NO. 9 BRAID SIZE 1/2, AWG 34
9. CRIMP PER ND1002206

* DENOTES LENGTH IN FEET

AR	1006253	ADHESIVE	13
2	1000242-33	FERRULE, ELEC COND	12
2	1000243-37	FERRULE, ELEC COND	11
* 0.1	SEE NOTE 6	INSULATION, SLEEVING	10
* 1.2	SEE NOTE 8	WIRE, BRAID	9
* 0.5	MIL-W-16878/4, E22, BLK	WIRE, ELEC	8
* 27	1019391-11	WIRE, ELEC, TWISTED PAIR	7
* 1.2	SEE NOTE 2	SLEEVING	6
3	1019972-4A	BAND MARKER, CABLE	5
~~1~~	~~1019972-4~~	~~BAND MARKER, CABLE~~	~~4~~
2	AN3420-16A	BUSHING	3
1	MS3126F-22-55SX	CONNECTOR, PLUG	2
1	MS3126F-24-61S	CONNECTOR, PLUG	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

1019965	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498

DRAWN DATE 30 MAR 64
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL C
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W33
OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020143
SCALE 1/1
WT
SHEET 1 OF 1

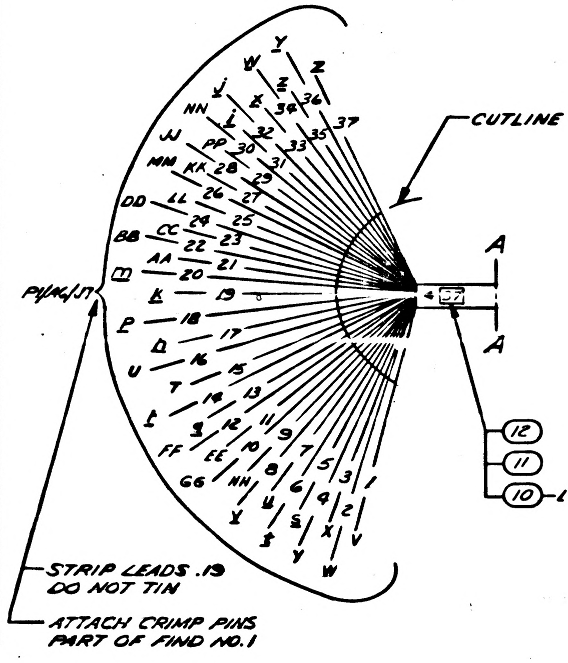
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

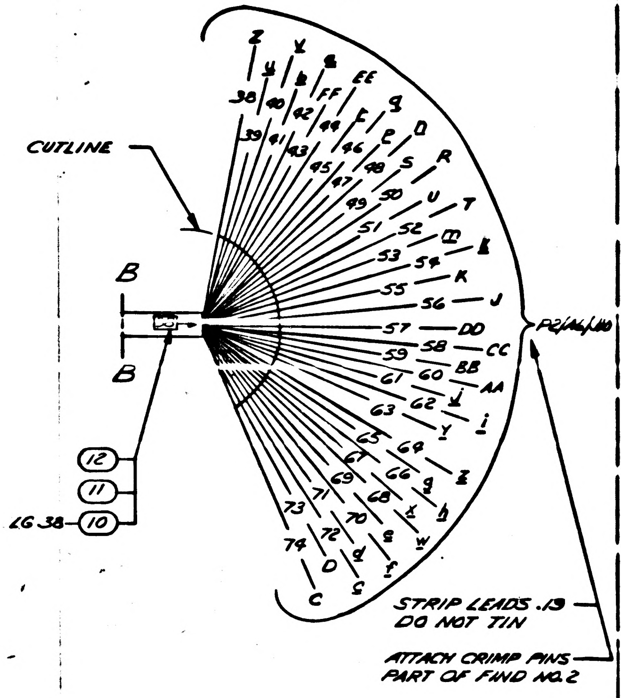
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

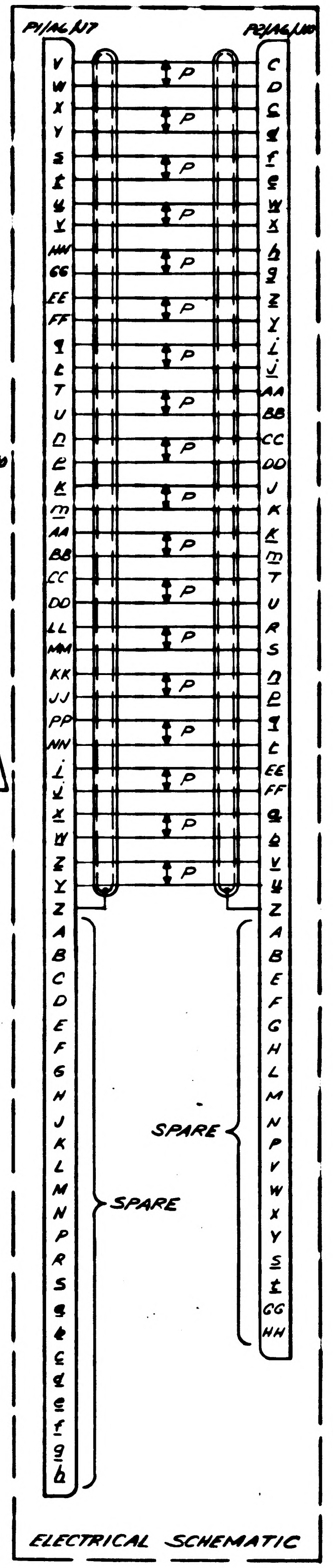
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
–	CL B RELEASED PER TDRR 02028	4/20/64	

ASSEMBLY DESIGNATION CHART

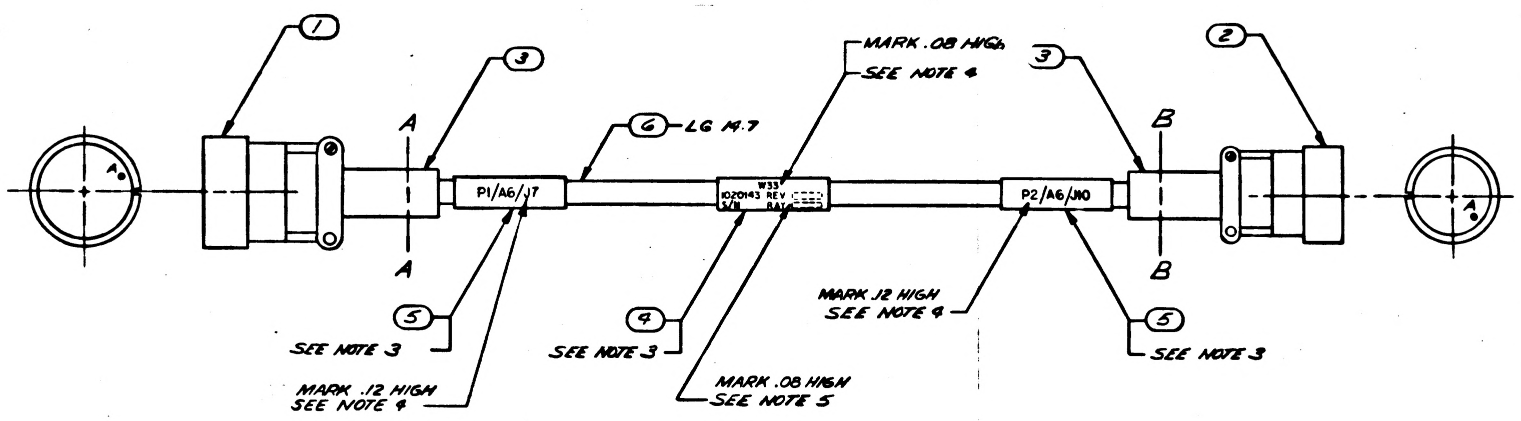
FROM		DESCRIPTION			TO	
REMARKS	RUN NO.	COLOR	AWG	FIND NO.	RUN NO.	REMARKS
	1	WHT	22	7	74	
	2	BLK			73	
	3	WHT	22	7	72	
	4	BLK			71	
	5	WHT	22	7	70	
	6	BLK			69	
	7	WHT	22	7	68	
	8	BLK			67	
	9	WHT	22	7	66	
	10	BLK			65	
	11	WHT	22	7	64	
	12	BLK			63	
	13	WHT	22	7	62	
	14	BLK			61	
	15	WHT	22	7	60	
	16	BLK			59	
	17	WHT	22	7	58	
	18	BLK			57	
	19	WHT	22	7	56	
	20	BLK			55	
	21	WHT	22	7	54	
	22	BLK			53	
	23	WHT	22	7	52	
	24	BLK			51	
	25	WHT	22	7	50	
	26	BLK			49	
	27	WHT	22	7	48	
	28	BLK			47	
	29	WHT	22	7	46	
	30	BLK			45	
	31	WHT	22	7	44	
	32	BLK			43	
	33	WHT	22	7	42	
	34	BLK			41	
	35	WHT	22	7	40	
	36	BLK			39	
	37	SHIELD		9	38	**


P1/A6/J7
CUTLINE
A
A
12
11
10 – LG .38
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.1


CUTLINE
P2/A6/J10
B
B
12
11
LG .38 – 10
STRIP LEADS .19
DO NOT TIN
ATTACH CRIMP PINS
PART OF FIND NO.2


P1/A6/J7
P2/A6/J10
P
SPARE
SPARE

ELECTRICAL SCHEMATIC


1
3
A
A
6 – LG 14.7
P1/A6/J7
MARK .08 HIGH
SEE NOTE 4
W33
1020143 REV
RAY
3
2
B
B
P2/A6/J10
5
SEE NOTE 3
MARK .12 HIGH
SEE NOTE 4
4
SEE NOTE 3
MARK .08 HIGH
SEE NOTE 5
MARK .12 HIGH
SEE NOTE 4
5
SEE NOTE 3

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 02028 DATE 4/20/64

NOTES

1. FOR SYMBOLS, FABRICATION AND REQD TESTS SEE ND1002032.
2. MIL-I-631, TYPE F, FORM U, GRADE a, CLASS I, CATEGORY I FOR FIND NO.6 AWG 5/8.
3. BOND USING TETRAHYDROFURAN WITH 10% POLYVINYL CHLORIDE
4. MARK BLACK CHARACTERS PER ND 1002019
5. MARK BLACK CHARACTERS PER ND 1002023
6. MIL-I-23053, CLASS I, COLOR BLACK FOR FIND NO. 10 SIZE NO. 5/8.
7. ** DENOTES ATTACH FIND NO. 8. LG 1.25.
8. QQ-B-575 FOR FIND NO. 9 BRAID SIZE 1/2.

* DENOTES LENGTH IN FEET

	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	2	1000242-33	FERRULE, ELEC COND	12
*	2	1000242-29	FERRULE, ELEC COND	11
*	0.1	SEE NOTE 6	INSULATION, SLEEVING	10
*	14.7	SEE NOTE 8	WIRE, BRAID	9
*	2.5	MIL-W-16878/4, E22, WHT	WIRE, ELEC	8
*	27	1019391-11	WIRE, ELEC, TWISTED PAIR	7
*	14.7	SEE NOTE 2	SLEEVING	6
	2	1019472-4A	BAND MARKER, CABLE	5
	1	1019472-4	BAND MARKER, CABLE	4
	2	AN3420-16A	BUSHING	3
	1	MS3126F-22-55SX	CONNECTOR, PLUG	2
	1	MS3126F-24-61S	CONNECTOR, PLUG	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1019965	1020002

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± .03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE 30
CHECKED
APPROVAL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

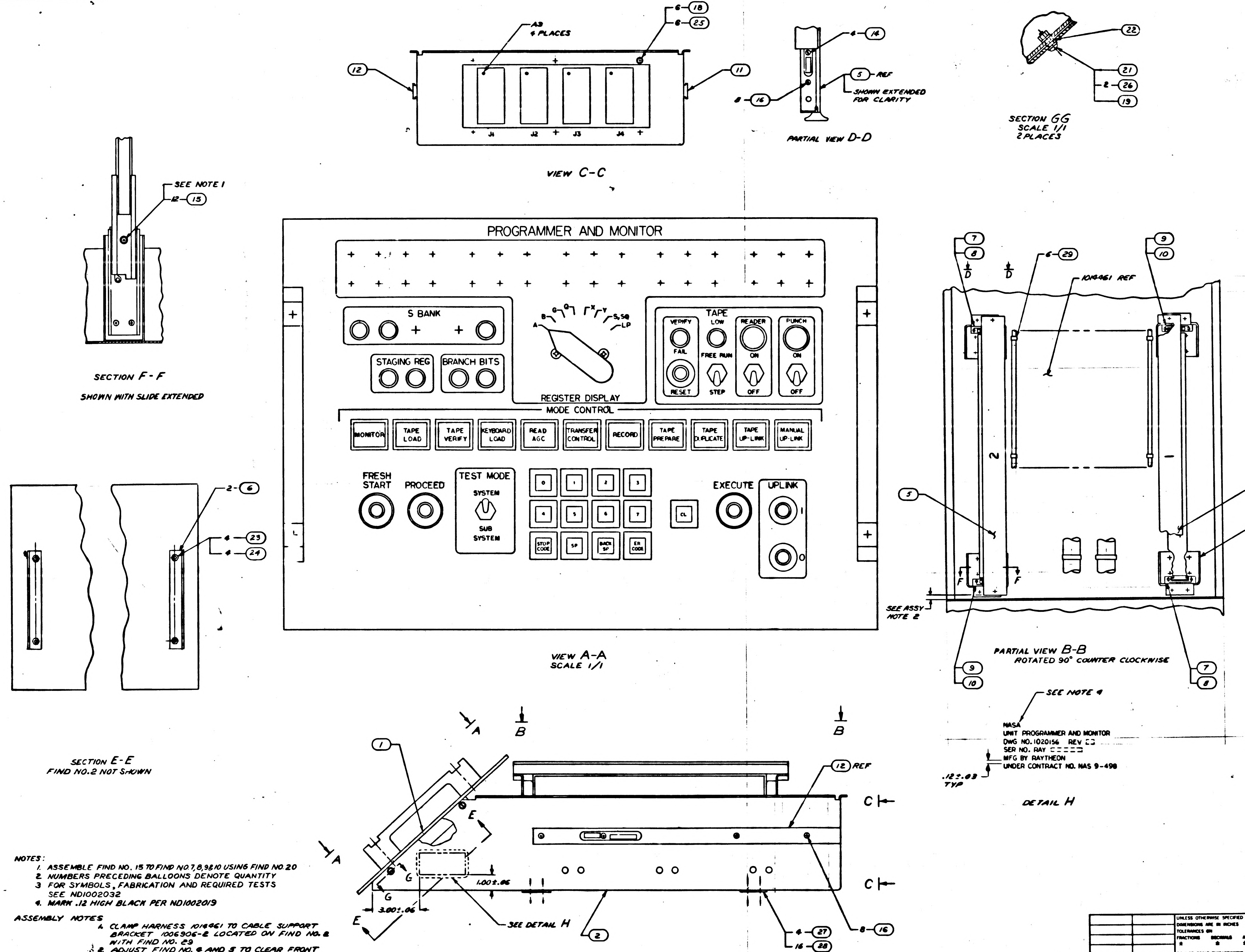
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE ASSEMBLY
W33
AGC/CTS OPERATION CONSOLE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020143
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR NO.		
A	CHANGED PER TDRR NO. 12829 DR. BG CHK APPD	6 OCT 64	


A3
4 PLACES
6-18
6-25
12
11
J1
J2
J3
J4
VIEW C-C
4-14
5-REF
SHOWN EXTENDED FOR CLARITY
8-16
PARTIAL VIEW D-D
22
21
2-26
19
SECTION GG
SCALE 1/1
2 PLACES
SEE NOTE 1
12-15
SECTION F-F
SHOWN WITH SLIDE EXTENDED
PROGRAMMER AND MONITOR
S BANK
STAGING REG
BRANCH BITS
REGISTER DISPLAY
TAPE
VERIFY
FAIL
RESET
LOW
FREE RUN
STEP
READER
ON
OFF
PUNCH
ON
OFF
MODE CONTROL
MONITOR
TAPE LOAD
TAPE VERIFY
KEYBOARD LOAD
READ AGC
TRANSFER CONTROL
RECORD
TAPE PREPARE
TAPE DUPLICATE
TAPE UP-LINK
MANUAL UP-LINK
FRESH START
PROCEED
TEST MODE
SYSTEM
SUB SYSTEM
0
1
2
3
4
5
6
7
STOP CODE
SP
BACK SP
ER CODE
CL
EXECUTE
UPLINK
VIEW A-A
SCALE 1/1
2-6
4-23
4-24
SECTION E-E
FIND NO.2 NOT SHOWN
7
8
9
10
6-29
1014461 REF
D
5
4
4-3
F
SEE ASSY NOTE 2
PARTIAL VIEW B-B
ROTATED 90° COUNTER CLOCKWISE
SEE NOTE 4
NASA
UNIT PROGRAMMER AND MONITOR
DWG NO.1020156 REV
SER NO. RAY
MFG BY RAYTHEON
UNDER CONTRACT NO. NAS 9-498
.125±.03 TYP
DETAIL H
A
B
1
E
12 REF
C
G
1.00±.06
3.00±.06
SEE DETAIL H
2
4-27
16-28
8-16

NOTES:

1. ASSEMBLE FIND NO. 15 TO FIND NO.7,8,9&10 USING FIND NO.20
2. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. MARK .12 HIGH BLACK PER ND1002019

ASSEMBLY NOTES

1. CLAMP HARNESS 1014461 TO CABLE SUPPORT BRACKET 1006906-2 LOCATED ON FIND NO. 2 WITH FIND NO. 29
2. ADJUST FIND NO. 4 AND 5 TO CLEAR FRONT PANEL (FIND NO. 1)

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7-10-64

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1014440	SCHEMATIC	REF
☒	1020064	INTERCONN. DIAGRAM	REF
6	MS17821-1	STRAP, CABLE	29
16	MS35200-42	SCREW, MACH-FLAT CSK HD	28
4	1020231	PLATE, SCREW SUPPORT	27
4	MS15795-306	WASHER, FLAT	26
6	MS35216-26	SCREW, PAN HD	25
4	MS15795-308	WASHER FLAT	24
4	MS21044-C3	NUT SELF LOCKING	23
2	1006982-5	WASHER, NYLON	22
2	MS35216-28	SCREW, PAN HD	21
A/R	MIL-S-40083 CL 31	SEALING COMPOUND	20
2	MS21044-C06	NUT, SELF-LOCKING	19
6	MS15795-308	WASHER, FLAT	18
~~24~~	~~[illegible]~~	~~WASHER, LOCK~~	~~17~~
16	MS35200-42	SCREW, FLAT HD	16
12	MS35200-40	SCREW, FLAT HD	15
4	MS35216-43	SCREW, PAN HD	14
~~24~~	~~[illegible]~~	~~SCREW, PAN HD~~	~~13~~
1	1006930-5	SLIDE, RH	12
1	1006930-6	SLIDE, LH	11
2	1006988-4	SLIDE, RH	10
2	1006988-2	SLIDE, RH	9
2	1006988-3	SLIDE, LH	8
2	1006988-1	SLIDE, LH	7
2	1020186	BRACKET, ANGLE	6
1	1020158	LOGIC PLATE ASSY NO 2	5
1	1020157	LOGIC PLATE ASSY NO.1	4
4	1014255-2	BRACKET ASSY	3
1	1020185	CHASSIS	2
1	1014143	PANEL ASSY	1

LIST OF MATERIALS

1014156	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-498
DRAWN DATE
CHECKED
APPROVAL 23 JUNE 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

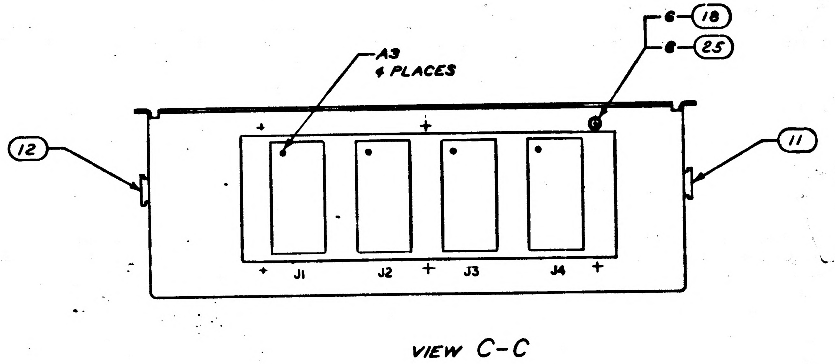
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

DRAWER ASSEMBLY
PROGRAMMER AND MONITOR

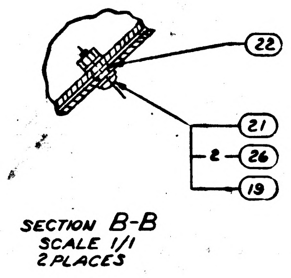
CODE IDENT NO —
SIZE J
NASA DRAWING NO. 1020156
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

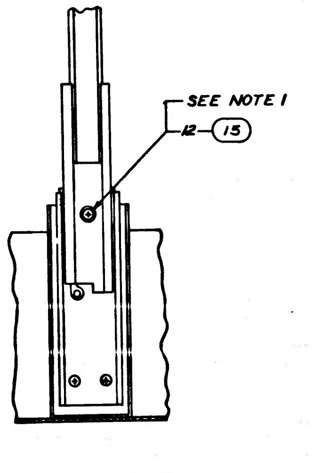
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR NO.		


6–(18)
6–(25)
A3
4 PLACES
(12)
(11)
J1
J2
J3
J4

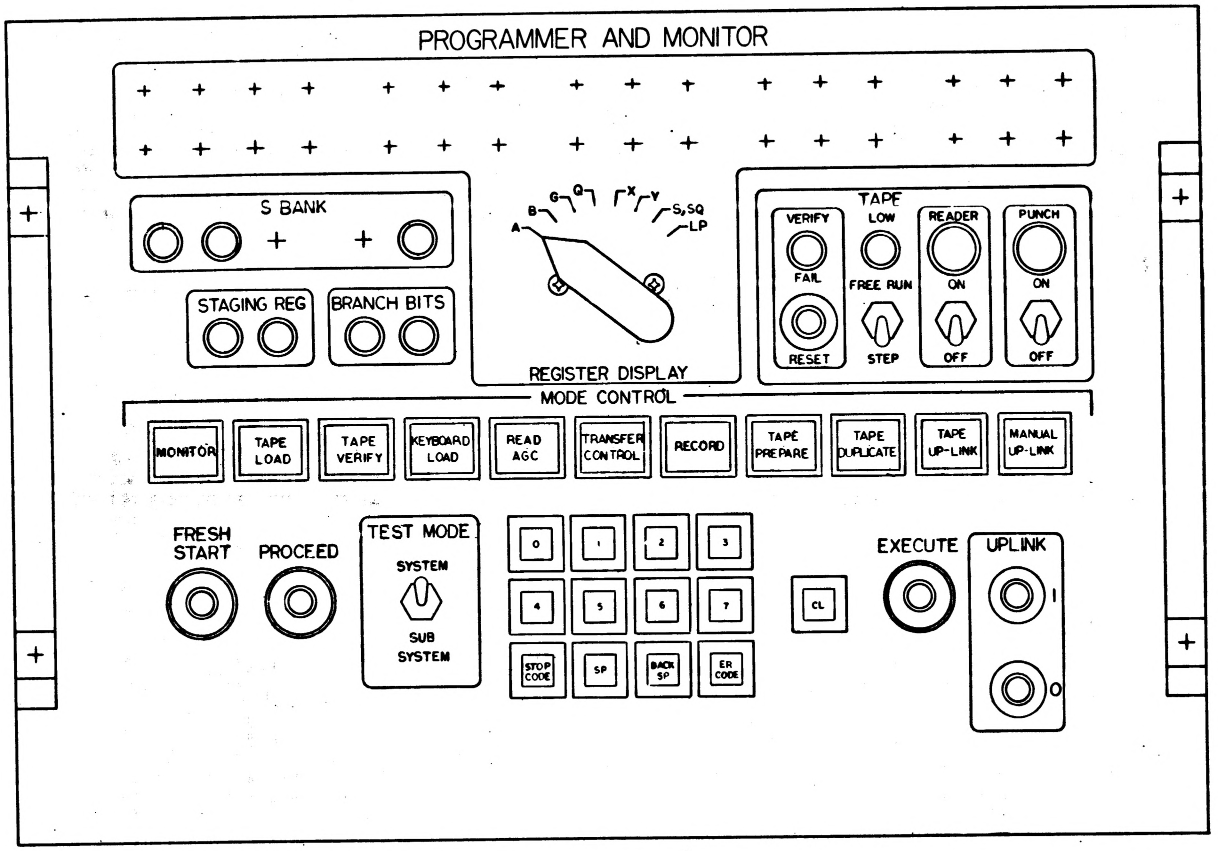
VIEW C–C

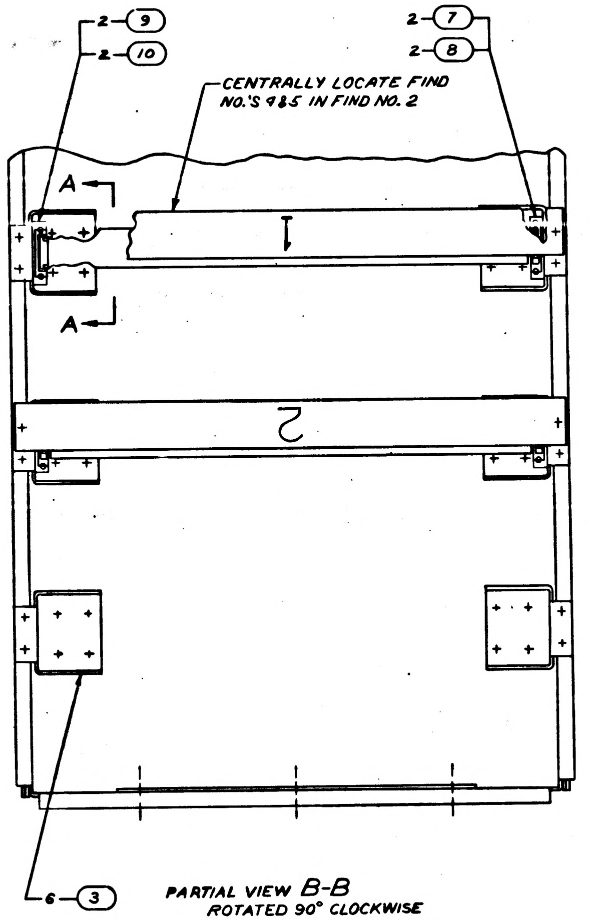


SECTION B-B
SCALE 1/1
2 PLACES


SEE NOTE 1
12–(15)

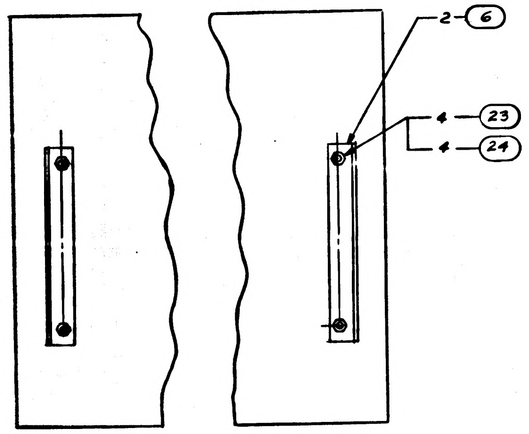
SECTION A-A
ROTATED 90° CW
SHOWN WITH SLIDE EXTENDED


PROGRAMMER AND MONITOR
S BANK
STAGING REG
BRANCH BITS
REGISTER DISPLAY
A
B
G
Q
X
Y
S, SQ
LP
TAPE
VERIFY
FAIL
RESET
LOW
FREE RUN
STEP
READER
ON
OFF
PUNCH
ON
OFF
MODE CONTROL
MONITOR
TAPE LOAD
TAPE VERIFY
KEYBOARD LOAD
READ AGC
TRANSFER CONTROL
RECORD
TAPE PREPARE
TAPE DUPLICATE
TAPE UP-LINK
MANUAL UP-LINK
FRESH START
PROCEED
TEST MODE
SYSTEM
SUB SYSTEM
0
1
2
3
4
5
6
7
STOP CODE
SP
BACK SP
ER CODE
CL
EXECUTE
UPLINK
I
O

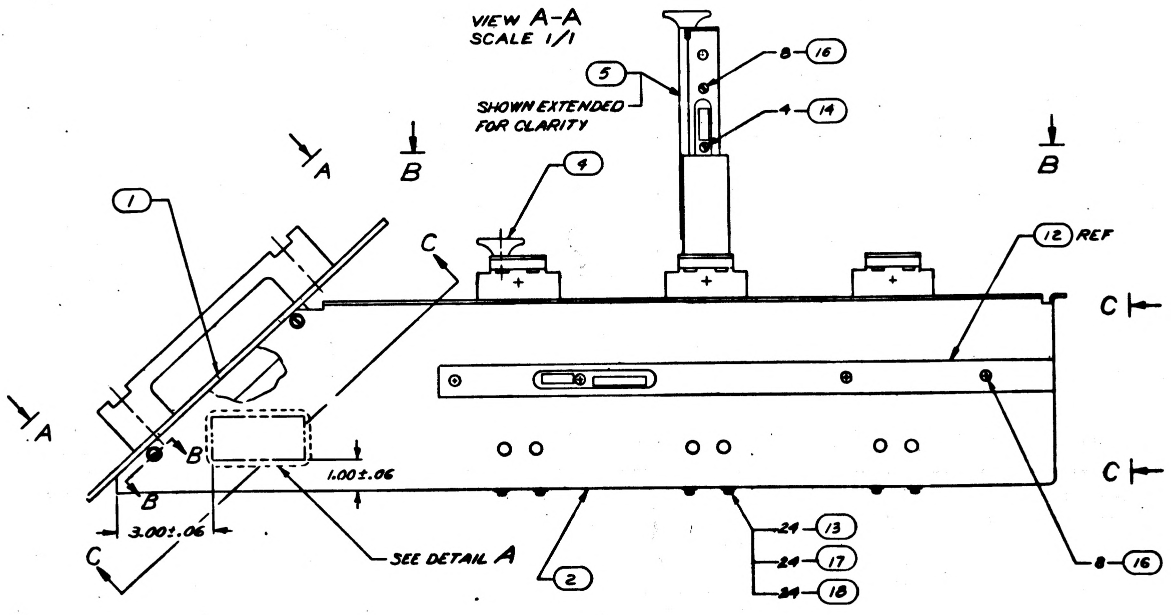

2–(9)
2–(10)
2–(7)
2–(8)
CENTRALLY LOCATE FIND NO.'S 4 & 5 IN FIND NO. 2
A
A
2
6–(3)

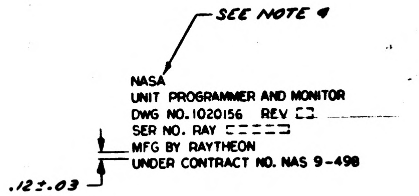
PARTIAL VIEW B-B
ROTATED 90° CLOCKWISE

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7/10/64



SECTION C-C
FIND NO. 2 NOT SHOWN


VIEW A-A
SCALE 1/1
(5)
SHOWN EXTENDED FOR CLARITY
8–(16)
4–(14)
(4)
(1)
A
A
B
B
B
B
C
C
C
C
(12) REF
1.00±.06
3.00±.06
SEE DETAIL A
(2)
24–(13)
24–(17)
24–(18)
8–(16)


SEE NOTE 4
.12±.03
TYP

NASA
UNIT PROGRAMMER AND MONITOR
DWG NO. 1020156 REV
SER NO. RAY
MFG BY RAYTHEON
UNDER CONTRACT NO. NAS 9-498

DETAIL A

NOTES:
1. ASSEMBLE FIND NO. 15 TO FIND NO. 7, 8, 9 & 10 USING FIND NO. 20
2. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
3. FOR SYMBOLS, FABRICATION AND REQUIRED TESTS SEE ND1002032
4. MARK .12 HIGH BLACK PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
—	1014440	SCHEMATIC	REF
—	1020064	INTERCONN. DIAGRAM	REF
4	MS15795-306	WASHER, FLAT	26
6	MS35216-26	SCREW, PAN HD	[illegible]
4	MS15795-308	WASHER FLAT	24
4	MS21044-C3	NUT SELF LOCK	23
2	1006982-5	WASHER, NYLON	22
2	MS35216-28	[illegible]	[illegible]
A/R	MIL-S-40083 CL 31	SEALING COMPOUND	[illegible]
2	MS21044-C06	NUT, SELF-LOCKING	19
30	MS15795-308	WASHER, FLAT	18
24	MS35337-80	WASHER, LOCK	17
16	MS35200-42	SCREW, FLAT HD	16
12	MS35200-40	SCREW, FLAT HD	15
4	MS35216-43	SCREW, PAN HD	14
24	MS35216-42	SCREW, PAN HD	13
1	1006930-5	SLIDE, RH	12
1	1006930-6	SLIDE, LH	11
2	1006988-4	SLIDE, RH	10
2	1006988-2	SLIDE, RH	9
2	1006988-3	SLIDE, LH	8
2	1006988-1	SLIDE, LH	7
2	1020186	BRACKET, ANGLE	6
1	1020158	LOGIC PLATE ASSY NO. 2	5
1	1020157	LOGIC PLATE ASSY NO. 1	4
6	1014255-2	BRACKET ASSY	3
1	1020185	CHASSIS	2
1	1014143	PANEL ASSY	1

LIST OF MATERIALS

1014156	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN DATE
CHECKED
APPROVAL 23 Jun 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL C. Sparling 7/6/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWER ASSEMBLY
PROGRAMMER AND MONITOR

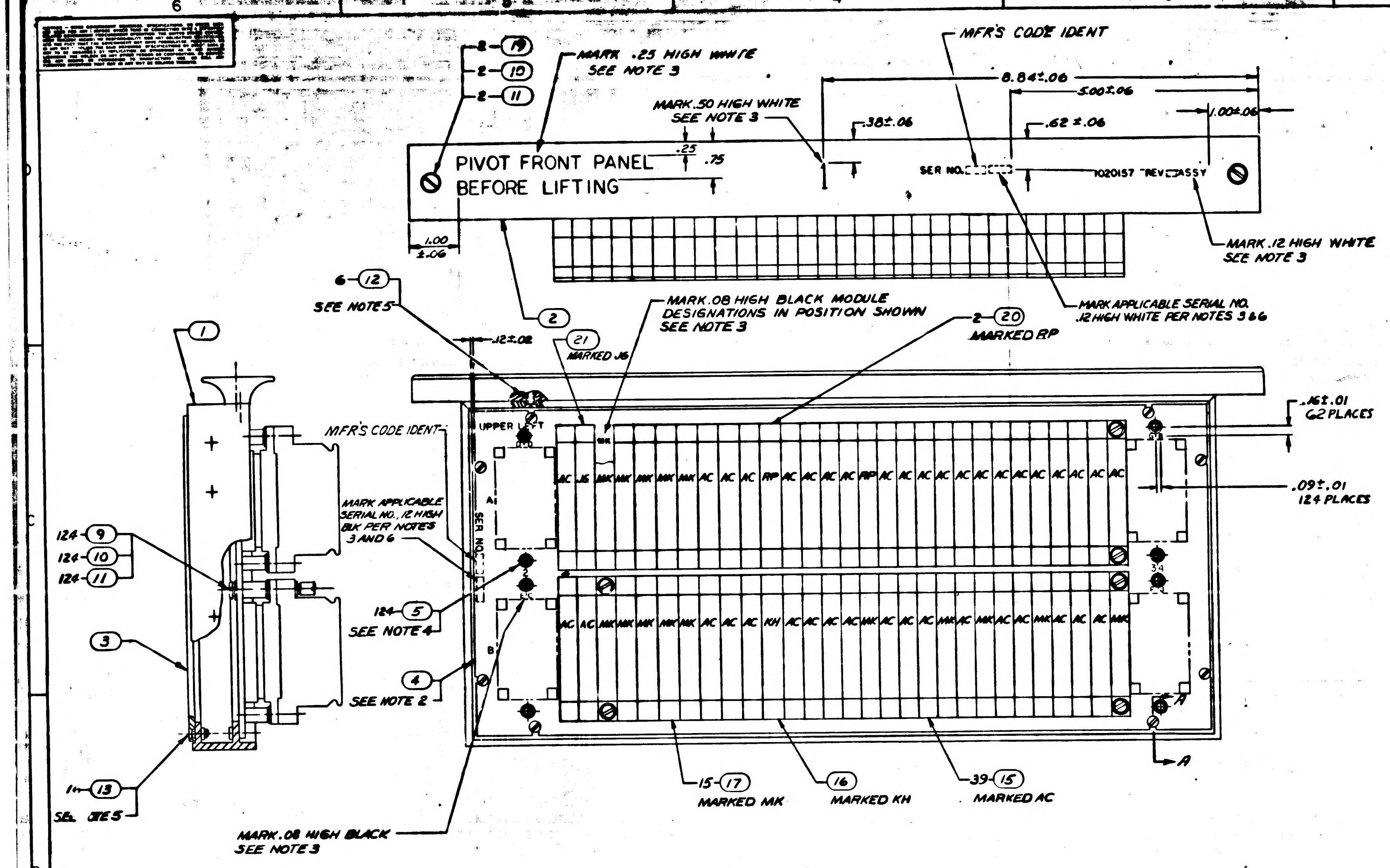
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 1020156
SCALE 1/2
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

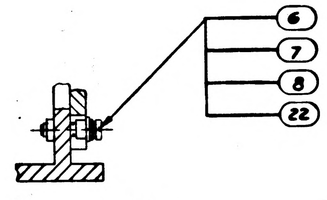
SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR NO. 11247	7/28/64	
A	CHANGED PER TDRR 11298 DR J.P. Leonard CHK Q.G.C. APPD	13 Aug 64	ACB

REVISIONS



2 (19)
2 (10)
2 (11)
MARK .25 HIGH WHITE SEE NOTE 3
MARK .50 HIGH WHITE SEE NOTE 3
MFR'S CODE IDENT
8.84±.06
5.00±.06
1.00±.06
.38±.06
.62±.06
.25
.75
PIVOT FRONT PANEL BEFORE LIFTING
SER NO.
1020157 REV ASSY
1.00 ±.06
MARK .12 HIGH WHITE SEE NOTE 3
MARK APPLICABLE SERIAL NO. .12 HIGH WHITE PER NOTES 3 & 6
6 (12) SEE NOTE 5
(2)
(21) MARKED J6
MARK .08 HIGH BLACK MODULE DESIGNATIONS IN POSITION SHOWN SEE NOTE 3
2 (20) MARKED RP
(1)
.12±.02
.16±.01 62 PLACES
.09±.01 124 PLACES
MFR'S CODE IDENT
UPPER LEFT
MARK APPLICABLE SERIAL NO. .12 HIGH BLK PER NOTES 3 AND 6
124 (9)
124 (10)
124 (11)
124 (5) SEE NOTE 4
(3)
(4) SEE NOTE 2
16 (13) SEE NOTE 5
MARK .08 HIGH BLACK SEE NOTE 3
15 (17) MARKED MK
(16) MARKED KH
39 (15) MARKED AC
A
B
A

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7/28/64



SECTION A-A
16 PLACES
SCALE 2/1

NOTES:

1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING 1020163 PER ND1002031
3. MARK PER ND1002019
4. LOCATE AND INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 12 & 13 TO FIND NO. 1 USING FIND NO. 14
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPPING PLATE, INSTALL ONE OF FIND NO. 23 BETWEEN PINS 1B17-3 & 1B17-20, ONE OF FIND NO. 23 BETWEEN PINS 1B34-8 & 1B33-20, ONE OF FIND NO. 23 BETWEEN PINS 1A12-8 & 1A14-20, ONE OF FIND NO. 23 BETWEEN PINS 1B2-9 & 1B5-20, ONE OF FIND NO. 23 BETWEEN PINS 1B1-19 & 1B3-20, ONE OF FIND NO. 23 BETWEEN PINS 1B13-4 & 1B14-20, ONE OF FIND NO. 29 BETWEEN PINS 1A35-6 & 1A35-20, & ONE OF FIND NO. 23 BETWEEN PINS 1A18-7 & 1A19-20, INSTALL WITH MINUS (−) ALWAYS ON PIN 20, SOLDER PER MIL-S-6872, FIND NO. 24 ON FIND NO. 23 LEADS AS REQUIRED & COVER CAPACITOR BODY USING FIND NO. 25, .56 LONG.
8. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, COLOR BLUE, AWG SIZE NO. 24, FOR FIND 24
9. AR DENOTES AS REQUIRED
10. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, AWG SIZE NO. 8, FOR FIND NO. 26

REV STATUS OF WIREWRAP	
PLATE REV	WIREWRAP REV
1020157 REV A	1020163 REV A

SEE NOTE 7

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	1020162	LOGIC FLOW DIAGRAM	REF
☒	1014266	LOGIC FLOW DIAGRAM	REF
☒	1014379	LOGIC FLOW DIAGRAM	REF
☒	1020161	LOGIC FLOW DIAGRAM	REF
☒	1020163	WIREWRAP MACH CARDS	REF
AR	SEE NOTE 10	SLEEVING	25
AR	SEE NOTE 8	SLEEVING	24
8	CS13AF010K	CAPACITOR	23
16	1006986	WASHER SHOULDER NYLON	22
1	1014065-3	MODULE, RESISTOR	21
2	1014065-2	MODULE, RESISTOR	20
2	1006998-1	SCREW, CAPTIVE	19
AR	ND1002107	WIRE NO. 24 AWG	18
15	1014096	MODULE, DRIVER	17
1	1014079	MODULE, GATED FLIP FLOP	16
39	1014034	MODULE, NOR	15
AR	MIL-S-40083, CLASS 31	SEALING & RETAINING COMP	14
16	MS35200-14	SCREW, FLAT HD	13
6	MS35200-24	SCREW, FLAT HD	12
126	MS35338-79	WASHER, LOCK	11
126	1006997	WASHER, FLAT	10
124	MS35233-29	SCREW, PAN HD	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
124	1014212	STANDOFF, PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1

LIST OF MATERIALS

1020156	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO
LEXINGTON, MASS
CONTRACT NO NAS-9-498
DRAWN R Hascher DATE 3 JUN 64
CHECKED A Caggiano 9 June 64
APPROVAL V. Colucci 25 June 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

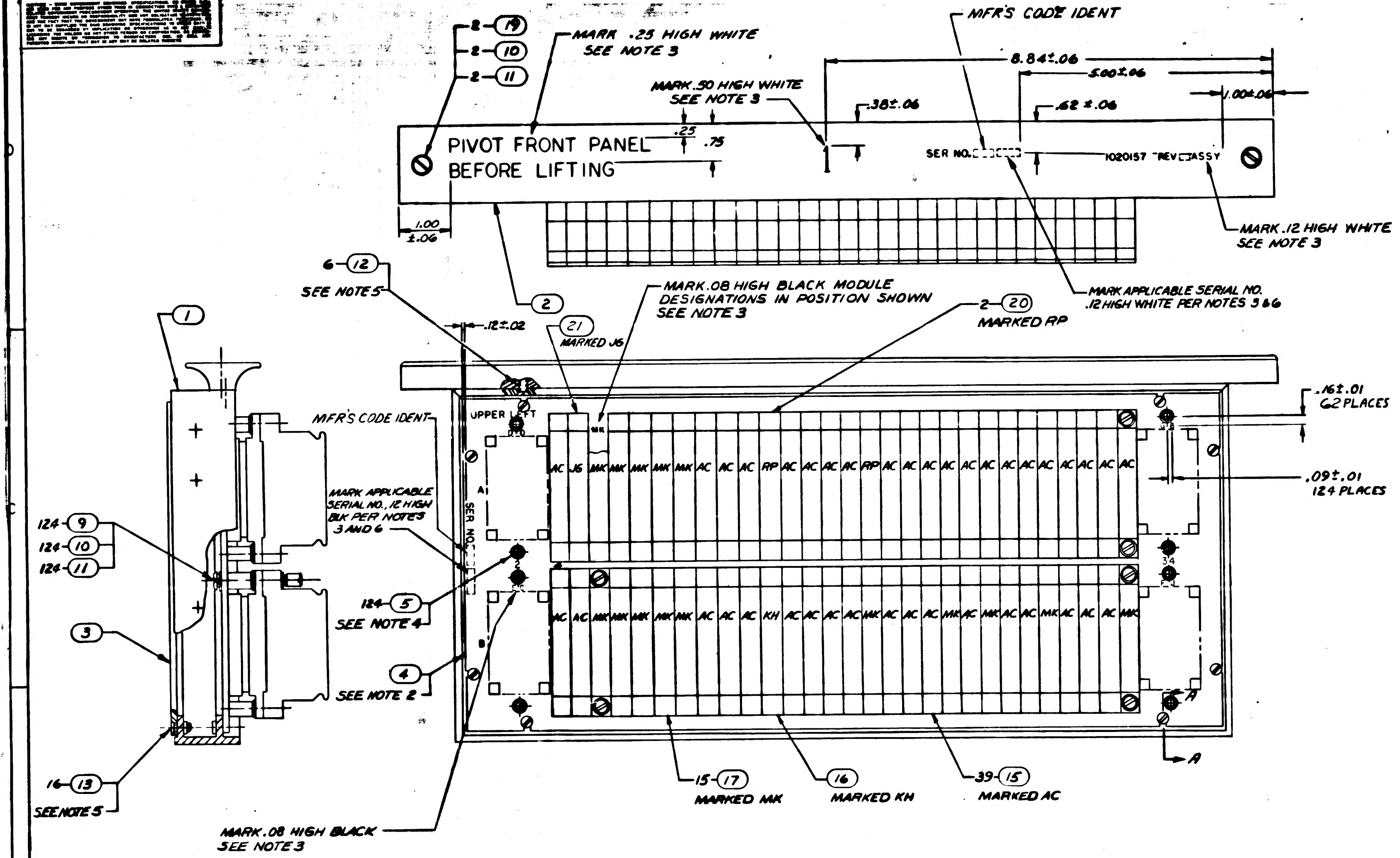
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC PLATE ASSY NO. 1
PROGRAMMER AND MONITOR

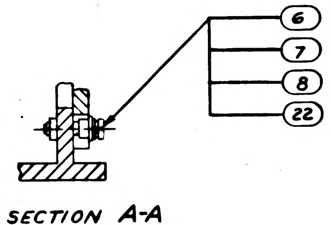
CODE IDENT NO —
SIZE F
NASA DRAWING NO. 1020157
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR NO. 11247	7/28/64	
A	CHANGED PER TDRR 11298 DR J.P. Leonard CHK Q.G.C. APPD	13 Aug 64	NLG
B	CHANGED - PER TDRR 11760 DR. R Fleischer CHK JCJ APPD	31 Aug 64	KJO


MFR'S CODE IDENT
2-(19)
2-(10)
2-(11)
MARK .25 HIGH WHITE SEE NOTE 3
MARK .50 HIGH WHITE SEE NOTE 3
8.84±.06
5.00±.06
1.00±.06
.38±.06
.62±.06
.25
.75
PIVOT FRONT PANEL BEFORE LIFTING
SER NO.
1020157 REV ASSY
1.00 ±.06
MARK .12 HIGH WHITE SEE NOTE 3
MARK APPLICABLE SERIAL NO. .12 HIGH WHITE PER NOTES 3 & 6
6-(12) SEE NOTE 5
(2)
MARK .08 HIGH BLACK MODULE DESIGNATIONS IN POSITION SHOWN SEE NOTE 3
2-(20) MARKED RP
(1)
.12±.02
(21) MARKED J6
MFR'S CODE IDENT
UPPER LEFT
.16±.01 62 PLACES
.09±.01 124 PLACES
MARK APPLICABLE SERIAL NO., .12 HIGH BLK PER NOTES 3 AND 6
SER NO.
AC J6 MK MK MK MK MK AC AC AC RP AC AC AC AC RP AC AC AC AC AC AC AC AC AC AC AC AC AC
AC AC MK MK MK MK MK AC AC AC KH AC AC AC AC MK AC AC AC MK AC MK AC AC MK AC AC AC MK
124-(9)
124-(10)
124-(11)
(3)
124-(5) SEE NOTE 4
(4) SEE NOTE 2
16-(13) SEE NOTE 5
A
MARK .08 HIGH BLACK SEE NOTE 3
15-(17) MARKED MK
(16) MARKED KH
39-(15) MARKED AC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7/14/64



SECTION A-A
16 PLACES
SCALE 2/1

REV STATUS OF WIREWRAP	
PLATE REV	WIREWRAP REV
1020157 REV A	1020163 REV A
1020157 REV B	1020163 REV. B

NOTES:

1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING 1020163 PER ND1002031
3. MARK PER ND1002019
4. LOCATE AND INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 12 & 13 TO FIND NO. 1 USING FIND NO. 14
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPPING PLATE, INSTALL ONE OF FIND NO. 23 BETWEEN PINS 1B17-3 & 1B17-20, ONE OF FIND NO. 23 BETWEEN PINS 1B34-8 & 1B33-20, ONE OF FIND NO. 23 BETWEEN PINS 1A12-8 & 1A14-20, ONE OF FIND NO. 23 BETWEEN PINS 1B2-9 & 1B5-20, ONE OF FIND NO. 23 BETWEEN PINS 1B1-19 & 1B3-20, ONE OF FIND NO. 23 BETWEEN PINS 1B13-4 & 1B14-20, ONE OF FIND NO. 23 BETWEEN PINS 1A35-6 & 1A35-20, & ONE OF FIND NO. 23 BETWEEN PINS 1A18-7 & 1A19-20, INSTALL WITH MINUS (–) ALWAYS ON PIN 20, SOLDER PER MIL-S-6872, FIND NO. 24 ON FIND NO. 23 LEADS AS REQUIRED & COVER CAPACITOR BODY USING FIND NO. 25, 56 LONG.
8. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, COLOR BLUE, AWG SIZE NO. 24, FOR FIND 24
9. AR DENOTES AS REQUIRED
10. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, AWG SIZE NO. 8, FOR FIND NO. 25

SEE NOTE 7

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	1020162	LOGIC FLOW DIAGRAM	REF
	1014266	LOGIC FLOW DIAGRAM	REF
	1014 79	LOGIC FLOW DIAGRAM	REF
	1020161	LOGIC FLOW DIAGRAM	REF
	1020163	WIREWRAP MACH CARDS	REF
AR	SEE NOTE 10	SLEEVING	25
AR	SEE NOTE 8	SLEEVING	24
8	CS13AF010K	CAPACITOR	23
16	1006986	WASHER SHOULDER NYLON	22
1	1014065-3	MODULE, RESISTOR	21
2	1014065-2	MODULE, RESISTOR	20
2	1006998-1	SCREW, CAPTIVE	19
AR	ND1002107	WIRE NO. 24 AWG	18
15	1014096	MODULE, DRIVER	17
1	1014079	MODULE, GATED FLIP FLOP	16
39	1014034	MODULE, NOR	15
AR	MIL-S-40083, CLASS 31	SEALING & RETAINING COMP	14
16	MS35200-14	SCREW, FLAT HD	13
6	MS35200-24	SCREW, FLAT HD	12
126	MS35338-79	WASHER, LOCK	11
126	1006997	WASHER, FLAT	10
124	MS35233-29	SCREW, PAN HD	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
124	1014212	STANDOFF, PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1

LIST OF MATERIALS

NEXT ASSY	USED ON
1020156	1014156

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS-9-498
DRAWN R Fleischer DATE 3 JUN 64
CHECKED A Cappiano 9 June 64
APPROVAL V. Colasanti 25 June 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

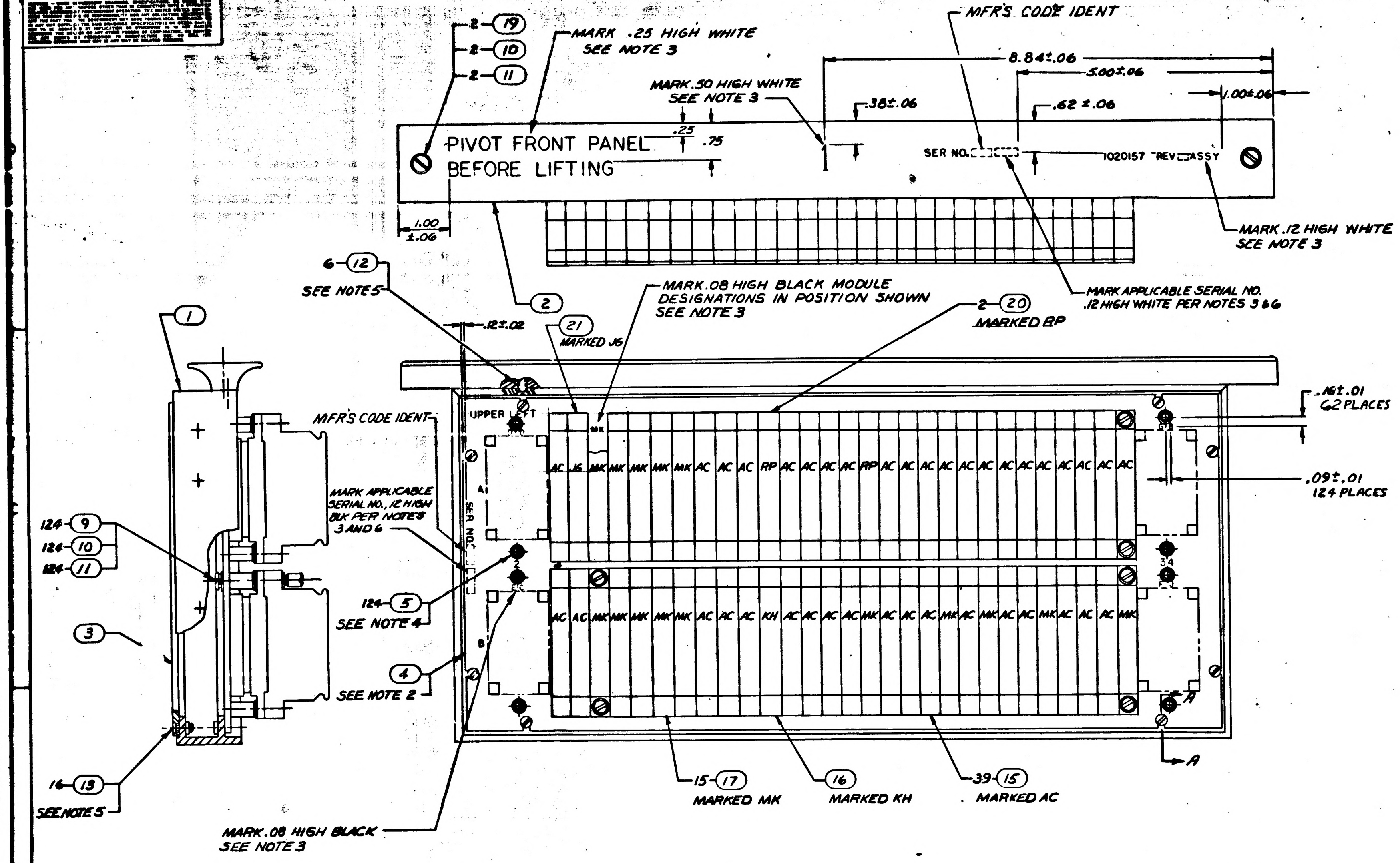
LOGIC PLATE ASSY NO.1
PROGRAMMER AND MONITOR

CODE IDENT NO —
SIZE F
NASA DRAWING NO. 1020157
SCALE 1/1
WT
SHEET 1 OF 1

1020157

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

SYM	DESCRIPTION	DATE	APPROVED
—	CL B RELEASE PER TDRR NO. 11247	7/28/64	


2-(19)
2-(10)
2-(11)
MARK .25 HIGH WHITE SEE NOTE 3
MFR'S CODE IDENT
8.84±.06
5.00±.06
MARK .50 HIGH WHITE SEE NOTE 3
.38±.06
.62 ±.06
1.00±.06
PIVOT FRONT PANEL BEFORE LIFTING
.25
.75
SER NO.
1020157 REV ASSY
MARK .12 HIGH WHITE SEE NOTE 3
1.00 ±.06
6-(12)
SEE NOTES 5
(2)
MARK APPLICABLE SERIAL NO. .12 HIGH WHITE PER NOTES 3 & 6
MARK .08 HIGH BLACK MODULE DESIGNATIONS IN POSITION SHOWN SEE NOTE 3
2-(20) MARKED RP
(1)
.12±.02
(21) MARKED J6
.16±.01 62 PLACES
MFR'S CODE IDENT
UPPER LEFT
MARK APPLICABLE SERIAL NO., .12 HIGH BLK PER NOTES 3 AND 6
SER NO.
A
B
124-(9)
124-(10)
124-(11)
124-(5)
SEE NOTE 4
(3)
(4)
SEE NOTE 2
16-(13)
SEE NOTE 5
AC J6 MK MK MK MK MK AC AC AC RP AC AC AC AC RP AC AC AC AC AC AC AC AC AC AC AC AC AC
AC AC MK MK MK MK MK AC AC AC KH AC AC AC AC MK AC AC AC MK AC MK AC AC MK AC AC AC MK
.09±.01 124 PLACES
A
A
MARK .08 HIGH BLACK SEE NOTE 3
15-(17) MARKED MK
(16) MARKED KH
39-(15) MARKED AC

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7/28/64

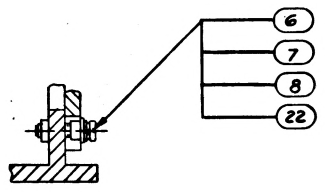
SEE NOTE 7

☒	1020162	LOGIC FLOW DIAGRAM	REF
☒	1014266	LOGIC FLOW DIAGRAM	REF
☒	1014379	LOGIC FLOW DIAGRAM	REF
☒	1020161	LOGIC FLOW DIAGRAM	REF
☒	1020163	WIREWRAP MACH CARDS	REF
AR	SEE NOTE 10	SLEEVING	25
AR	SEE NOTE 8	SLEEVING	24
8	CS13AF010K	CAPACITOR	23
16	1006986	WASHER SHOULDER NYLON	22
1	1014065-3	MODULE, RESISTOR	21
2	1014065-2	MODULE, RESISTOR	20
2	1006998-1	SCREW, CAPTIVE	19
AR	ND1002107	WIRE NO.24 AWG	18
15	1014096	MODULE, DRIVER	17
1	1014079	MODULE, GATED FLIP FLOP	16
39	1014034	MODULE, NOR	15
AR	MIL-S-40083, CLASS 31	SEALING & RETAINING COMP	14
16	MS35200-14	SCREW, FLAT HD	13
6	MS35200-24	SCREW, FLAT HD	12
126	MS35338-79	WASHER, LOCK	11
126	1006997	WASHER, FLAT	10
124	MS35233-29	SCREW, PAN HD	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
124	1014212	STANDOFF, PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NOTES:

1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING 1020163 PER ND1002031
3. MARK PER ND1002019
4. LOCATE AND INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 12 & 13 TO FIND NO. 1 USING FIND NO. 14
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPPING PLATE, INSTALL ONE OF FIND NO. 23 BETWEEN PINS 1B17-3 & 1B17-20, ONE OF FIND NO. 23 BETWEEN PINS 1B34-8 & 1B33-20, ONE OF FIND NO. 23 BETWEEN PINS 1A12-8 & 1A14-20, ONE OF FIND NO. 23 BETWEEN PINS 1B2-9 & 1B5-20, ONE OF FIND NO. 23 BETWEEN PINS 1B1-19 & 1B3-20, ONE OF FIND NO. 23 BETWEEN PINS 1B13-4 & 1B14-20, ONE OF FIND NO. 23 BETWEEN PINS 1A35-6 & 1A35-20, & ONE OF FIND NO. 23 BETWEEN PINS 1A18-7 & 1A19-20, INSTALL WITH MINUS (−) ALWAYS ON PIN 20, SOLDER PER MIL-S-6872, FIND NO. 24 ON FIND NO. 23 LEADS AS REQUIRED & COVER CAPACITOR BODY USING FIND NO. 25, .56 LONG.
8. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, COLOR BLUE, AWG SIZE NO. 24, FOR FIND 24
9. AR DENOTES AS REQUIRED
10. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATEGORY I, AWG SIZE NO. 8, FOR FIND NO. 25



SECTION A-A
16 PLACES
SCALE 2/1

MASTER

1020156	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS-9-498
DRAWN R Fleischer DATE 3 JUN 64
CHECKED A Cazzeidan 4 June 64
APPROVAL V. Chiaverathom 25 June
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL C Sparling 7/15/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

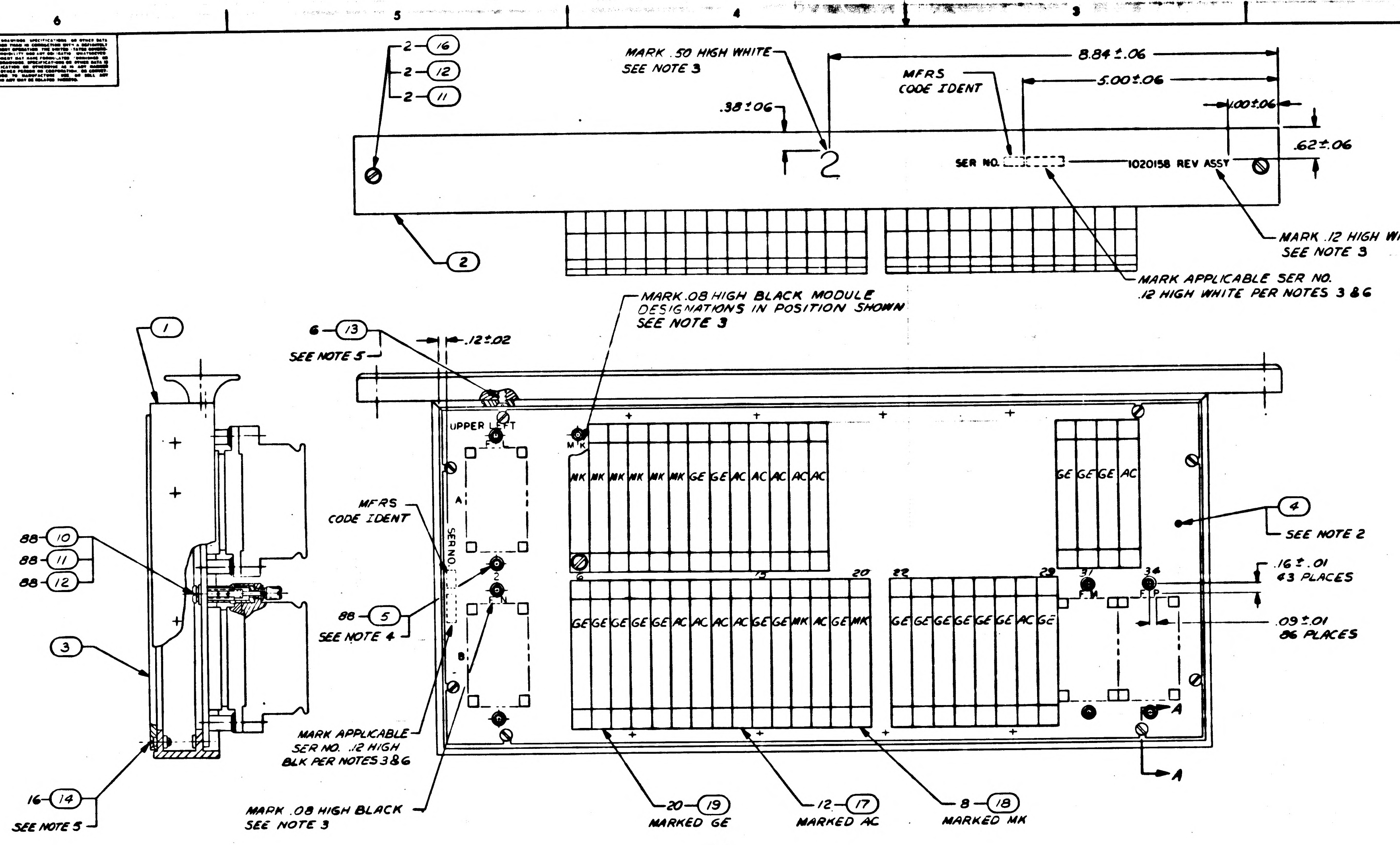
LOGIC PLATE ASSY NO.1
PROGRAMMER AND MONITOR

CODE IDENT NO. — SIZE F NASA DRAWING NO. 1020157
SCALE 1/1 WT SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

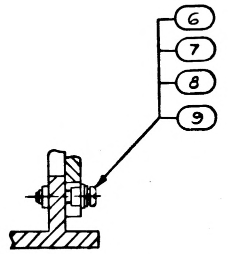
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 11247		
A	CHANGED PER TDRR NO 11299 DR J.J. McL. CHKG G.C. APPD	8/17	


2-16
2-12
2-11
MARK .50 HIGH WHITE
SEE NOTE 3
.38±.06
2
8.84±.06
MFRS
CODE IDENT
5.00±.06
1.00±.06
.62±.06
SER NO.
1020158 REV ASSY
2
MARK .12 HIGH WHITE CHARACTERS
SEE NOTE 3
MARK APPLICABLE SER NO.
.12 HIGH WHITE PER NOTES 3 & 6
MARK .08 HIGH BLACK MODULE
DESIGNATIONS IN POSITION SHOWN
SEE NOTE 3
1
6-13
SEE NOTE 5
.12±.02
UPPER LEFT
MK
MK MK MK MK MK MK GE GE AC AC AC AC AC
GE GE GE AC
4
SEE NOTE 2
88-10
88-11
88-12
MFRS
CODE IDENT
SER NO.
A
B
88-5
SEE NOTE 4
3
6
15
20
22
29
31
34
GE GE GE GE GE AC AC AC AC GE GE MK AC GE MK
GE GE GE GE GE GE AC GE
.16±.01
43 PLACES
.09±.01
86 PLACES
A
A
MARK APPLICABLE
SER NO. .12 HIGH
BLK PER NOTES 3 & 6
16-14
SEE NOTE 5
MARK .08 HIGH BLACK
SEE NOTE 3
20-19
MARKED GE
12-17
MARKED AC
8-18
MARKED MK

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 2/20/64

NOTES
1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING FIND NO. 20, USING 1020160 PER ND1002031
3. MARK PER ND1002019
4. LOCATE & INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 13 AND FIND NO. 14 TO FIND NO. 1 USING FIND NO. 15
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPING PLATE, INSTALL ONE
OF FIND NO. 21 BETWEEN PINS 2A33-6 & 2A33-20,
ONE OF FIND NO. 21 BETWEEN PINS 2B13-5 & 2B13-20,
ONE OF FIND NO. 21 BETWEEN PINS 2A15-6 & 2A15-20,
ONE OF FIND NO. 21 BETWEEN PINS 2B14-8 & 2B14-20,
ONE OF FIND NO. 21 BETWEEN PINS 2A12-9 & 2A12-20,
ONE OF FIND NO. 21 BETWEEN PINS 2A15-9 & 2A15-20,
ONE OF FIND NO. 21 BETWEEN PINS 2B14-3 & 2B14-20.
INSTALL WITH MINUS (-) ALWAYS ON PIN 20. INSTALL FIND NO. 24 BETWEEN PINS 2B15-6 & 2B16-5. SOLDER PER MIL-S-6872
FIND NO 22 ON FIND NO 21 & 24 LEADS AS REQUIRED & COVER CAPACITOR
BODY USING FIND NO. 23, .56 LG. & COVER RESISTOR BODY USING FIND NO. 25, .56 LG
8. MIL-I-631, TYPE F, FORM Ua GRADE a, CLASS I, CATEGORY I, COLOR BLUE,
AWG SIZE 24 FOR FIND NO. 22
9. AR DENOTES AS REQUIRED
10. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATERGORY I
AWG SIZE NO. 8 FOR FIND NO. 23, & AWG SIZE NO. 10 FOR FIND NO. 25



SECTION A-A
16 PLACES
SCALE 2/1

SEE NOTE 7

REV STATUS OF WIRE WRAP	
PLATE REV	WIREWRAP REV
1020158 REV A	1020160 REV —

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1020160	WIREWRAP MACH. CARDS	REF
☒	1020159	LOGIC FLOW DIAGRAM	REF
AR	SEE NOTE 10	SLEEVING	25
1	1006750-39	RESISTOR, 2K, 1/4W, ±2%	24
AR	SEE NOTE 10	SLEEVING	23
AR	SEE NOTE 8	SLEEVING	22
7	CS13AF010K	CAPACITOR 1UF, 35V	21
AR	ND1002107	WIRE, NO. 24 AWG	20
20	1014230	MODULE, INTERFACE RCVR	19
8	1014096	MODULE, DRIVER	18
12	1014034	MODULE, NOR	17
2	1006998-1	SCREW, CAPTIVE	16
AR	MIL-S-40083 CL 31	SEALING & RETAINING COMPOUND	15
16	MS35200-14	SCREW, FLAT HD	14
6	MS35200-24	SCREW, FLAT HD	13
90	MS35338-79	WASHER, LOCK	12
90	1006997	WASHER, FLAT	11
88	MS35233-29	SCREW, PAN HD	10
16	1006986	WASHER, SHOULDERED, NYLON	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
88	1014212	STANDOFF PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1

LIST OF MATERIALS

1020158

1020156	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO NAS 9-496
DRAWN H. Kelley DATE 26 MAY 64
CHECKED A. Cagliano 27 May 64
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 2/5/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

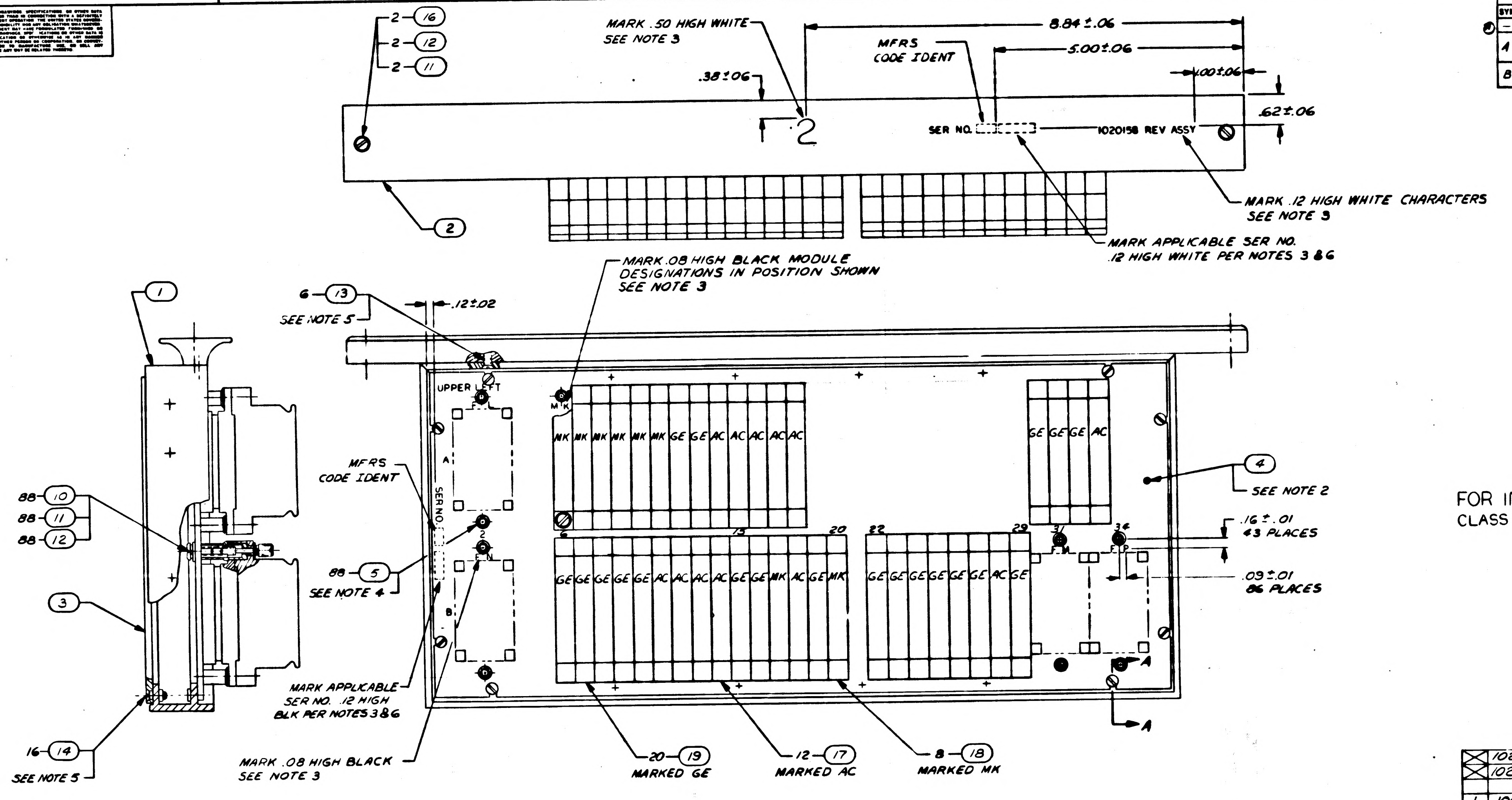
LOGIC PLATE ASSY NO. 2
PROGRAMMER AND MONITOR

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020158
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

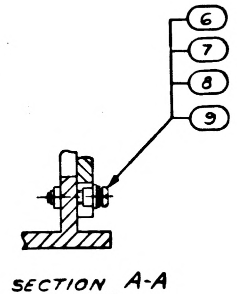
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 11247		
A	CHANGED PER TDRR NO 11299 DR [illegible] CHKD G.C. APPD [illegible]	[illegible]	[illegible]
B	CHANGED PER TDRR NO 11760 DR [illegible] CHK J.C.J. APPD [illegible]	31 AUG 64	[illegible]


2-16
2-12
2-11
MARK .50 HIGH WHITE SEE NOTE 3
8.84±.06
MFRS CODE IDENT
5.00±.06
.38±.06
1.00±.06
.62±.06
2
SER NO.
1020158 REV ASSY
2
MARK .12 HIGH WHITE CHARACTERS SEE NOTE 3
MARK APPLICABLE SER NO. .12 HIGH WHITE PER NOTES 3 & 6
MARK .08 HIGH BLACK MODULE DESIGNATIONS IN POSITION SHOWN SEE NOTE 3
1
6-13
SEE NOTE 5
.12±.02
UPPER LEFT
MK
MK MK MK MK MK MK GE GE AC AC AC AC AC
GE GE GE AC
4
SEE NOTE 2
MFRS CODE IDENT
SER NO.
A
B
88-10
88-11
88-12
88-5
SEE NOTE 4
3
6
15
20
22
29
31
34
GE GE GE GE GE AC AC AC AC GE GE MK AC GE MK
GE GE GE GE GE GE AC GE
.16±.01 43 PLACES
.09±.01 86 PLACES
A
A
MARK APPLICABLE SER NO. .12 HIGH BLK PER NOTES 3 & 6
16-14
SEE NOTE 5
MARK .08 HIGH BLACK SEE NOTE 3
20-19 MARKED GE
12-17 MARKED AC
8-18 MARKED MK

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE [illegible]

NOTES

1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING FIND NO. 20, USING 1020160 PER ND1002031
3. MARK PER ND1002019
4. LOCATE & INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 13 AND FIND NO. 14 TO FIND NO. 1 USING F. ID NO. 15
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPING PLATE, INSTALL ONE
   OF FIND NO. 21 BETWEEN PINS 2A33-6 & 2A33-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B13-5 & 2B13-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A15-6 & 2A15-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B14-8 & 2B14-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A12-9 & 2A12-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A15-9 & 2A15-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B14-3 & 2B14-20.
   INSTALL WITH MINUS (-) ALWAYS ON PIN 20. INSTALL ONE OF FIND NO. 24 BETWEEN PINS 2B15-6 & 2B16-5, ONE OF FIND NO. 24 BETWEEN PINS 2B10-4 & 2B9-5 & FIND NO. 26 BETWEEN PINS 2B15-16 & 2B17-9, SOLDER PER MIL-S-6872 FIND NO. 22 ON FIND NO. 21, 24 & 26 LEADS AS REQUIRED & COVER CAPACITOR BODY USING FIND NO. 23, .56 LG, & COVER RESISTOR BODY USING FIND NO. 25, .56 LG
8. MIL-I-631, TYPE F, FORM Ua GRADE a, CLASS I, CATEGORY I, COLOR BLUE, AWG SIZE 24 FOR FIND NO. 22
9. AR DENOTES AS REQUIRED
10. MIL-I-631, TYPE F, FORM Ua, GRADE a, CLASS I, CATERGORY I AWG SIZE NO. 8 FOR FIND NO. 23, & AWG SIZE NO. 10 FOR FIND NO. 25



SECTION A-A
16 PLACES
SCALE 2/1

REV STATUS OF WIREWRAP	
PLATE REV	WIREWRAP REV
1020158 REV A	1020160 REV —
1020158 REV B	1020160 REV A

SEE NOTE 7

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1020160	WIREWRAP MACH CARDS	REF
☒	1020159	LOGIC FLOW DIAGRAM	REF
1	1006750-36	RESISTOR, 1.5K, 1/4W, ±2%	26
AR	SEE NOTE 10	SLEEVING	25
2	1006750-39	RESISTOR, 2K, 1/4W, ±2%	24
AR	SEE NOTE 10	SLEEVING	23
AR	SEE NOTE 8	SLEEVING	22
7	CS13AF010K	CAPACITOR 1UF, 35V	21
AR	ND1002107	WIRE, NO. 24 AWG	20
20	1014230	MODULE, INTERFACE RCVR	19
8	1014096	MODULE, DRIVER	18
12	1014034	MODULE, NOR	17
2	1006998-1	SCREW, CAPTIVE	16
AR	MIL-S-40083 CL 31	SEALING & RETAINING COMPOUND	15
16	MS35200-14	SCREW, FLAT HD	14
6	MS35200-24	SCREW, FLAT HD	13
90	MS35338-79	WASHER, LOCK	12
90	1006997	WASHER, FLAT	11
88	MS35233-29	SCREW, PAN HD	10
16	1006986	WASHER, SHOULDERED, NYLON	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
88	1014212	STANDOFF, PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1

LIST OF MATERIALS

1020156	1014156
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]
MIT APPROVAL [illegible] 7/5/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC PLATE ASSY NO. 2
PROGRAMMER AND MONITOR

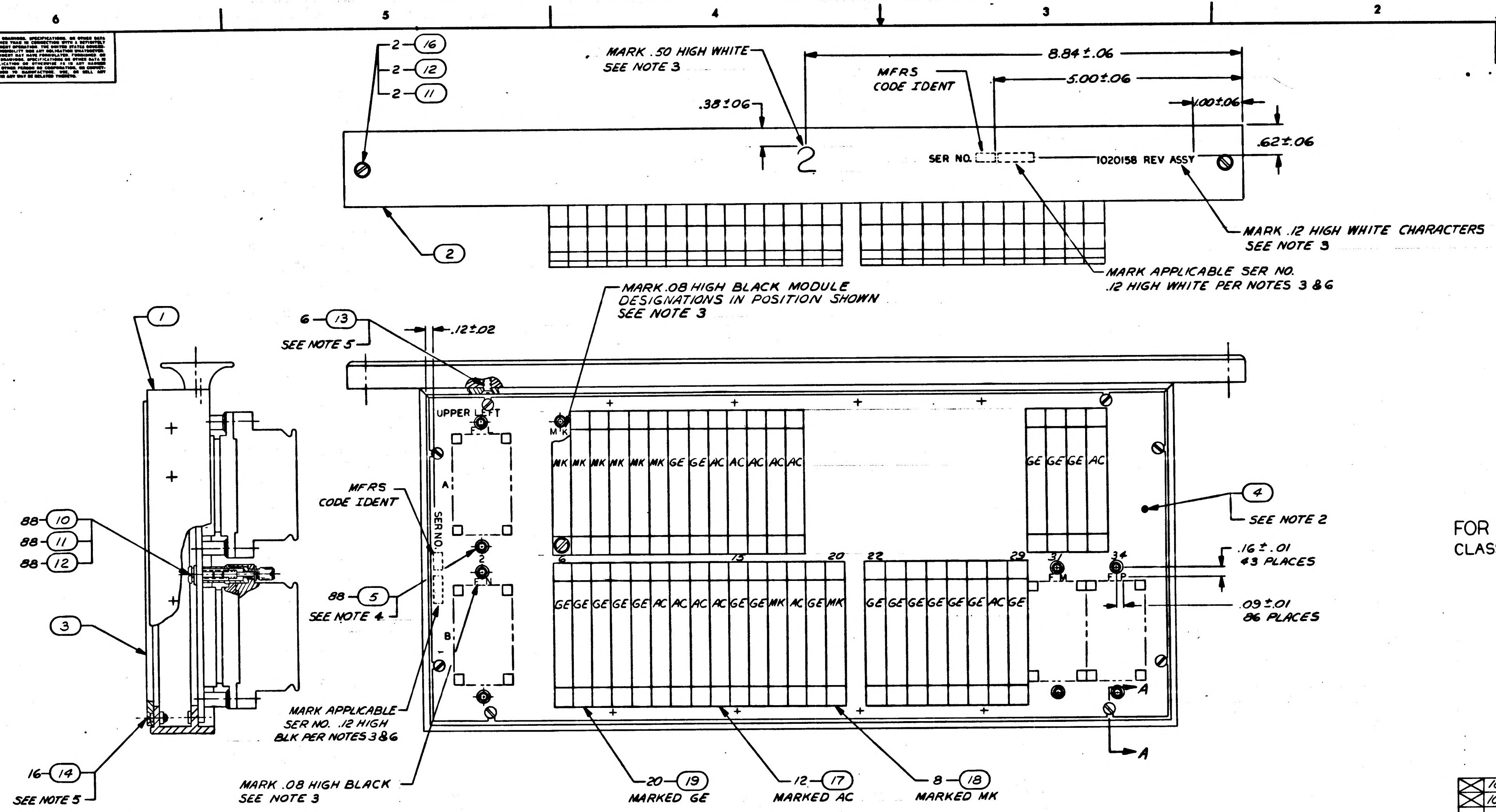
CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020158
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

1020158

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

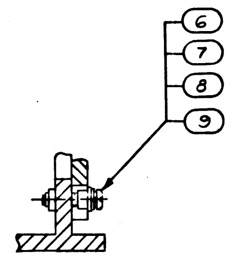
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
—	CLASS B RELEASED PER TDRR 11247		


6
5
4
3
2
1
2-16
2-12
2-11
MARK .50 HIGH WHITE SEE NOTE 3
.38±.06
8.84±.06
5.00±.06
1.00±.06
.62±.06
MFRS CODE IDENT
2
SER NO.
1020158 REV ASSY
MARK .12 HIGH WHITE CHARACTERS SEE NOTE 3
MARK APPLICABLE SER NO. .12 HIGH WHITE PER NOTES 3 & 6
MARK .08 HIGH BLACK MODULE DESIGNATIONS IN POSITION SHOWN SEE NOTE 3
1
6-13
SEE NOTE 5
.12±.02
UPPER LEFT
MK
MK MK MK MK MK GE GE AC AC AC AC AC
GE GE GE AC
4
SEE NOTE 2
MFRS CODE IDENT
SER NO.
A
B
88-10
88-11
88-12
88-5
SEE NOTE 4
3
15
20
22
29
31
34
.16±.01 43 PLACES
.09±.01 86 PLACES
GE GE GE GE GE AC AC AC AC GE GE GE MK AC GE MK
GE GE GE GE GE GE GE AC GE
A
A
16-14
SEE NOTE 5
MARK APPLICABLE SER NO. .12 HIGH BLK PER NOTES 3 & 6
MARK .08 HIGH BLACK SEE NOTE 3
20-19 MARKED GE
12-17 MARKED AC
8-18 MARKED MK

FOR INFORMATION ONLY
CLASS B RELEASE TDRR NO. 11247 DATE 7/20/64

NOTES

1. NUMBERS PRECEDING BALLOONS DENOTE QUANTITY
2. WIREWRAP FIND NO. 4 USING FIND NO. 20, USING 1020160 PER ND1002031
3. MARK PER ND1002019
4. LOCATE & INSTALL FIND NO. 5 PER KEY CODE MARKING USING DWG NO. 1014047
5. ASSEMBLE FIND NO. 13 AND FIND NO. 14 TO FIND NO. 1 USING FIND NO. 15
6. MARK SERIAL NO. PER ND1002023
7. AFTER MACHINE WIREWRAPING PLATE, INSTALL ONE
   OF FIND NO. 21 BETWEEN PINS 2A33-6 & 2A33-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B13-5 & 2B13-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A15-6 & 2A15-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B14-8 & 2B14-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A12-9 & 2A12-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2A15-9 & 2A15-20,
   ONE OF FIND NO. 21 BETWEEN PINS 2B14-3 & 2B14-20,
   INSTALL WITH MINUS (-) ALWAYS ON PIN 20, SOLDER PER MIL-S-6872
   FIND NO. 22 ON FIND NO. 21 LEADS AS REQUIRED & COVER CAPACITOR
   BODY USING FIND NO. 23, .56 LG
8. MIL-I-631, TYPE F, FORM U, GRADE A, CLASS I, CATEGORY I, COLOR BLUE,
   AWG SIZE 24 FOR FIND NO. 22, AWG SIZE NO. 8 FOR FIND NO 23
9. AR DENOTES AS REQUIRED



SECTION A-A
16 PLACES
SCALE 2/1

SEE NOTE 7

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	1020160	WIREWRAP MACH. CARDS	REF
☒	1020159	LOGIC FLOW DIAGRAM	REF
AR	SEE NOTE 9	SLEEVING	23
AR	SEE NOTE 8	SLEEVING	22
7	CS13AF010K	CAPACITOR 1UF, 35V	21
AR	ND1002107	WIRE, NO. 24 AWG	20
20	1014230	MODULE, INTERFACE RCVR	19
8	1014096	MODULE, DRIVER	18
12	1014034	MODULE, NOR	17
2	1006998-1	SCREW, CAPTIVE	16
AR	MIL-S-40083 CL 31	SEALING & RETAINING COMPOUND	15
16	MS35200-14	SCREW, FLAT HD	14
6	MS35200-24	SCREW, FLAT HD	13
90	MS35338-79	WASHER, LOCK	12
90	1006997	WASHER, FLAT	11
88	MS35233-29	SCREW, PAN HD	10
16	1006986	WASHER, SHOULDERED, NYLON	9
16	MS35338-78	WASHER, LOCK	8
16	MS15795-303	WASHER, FLAT	7
16	MS35233-17	SCREW, PAN HD	6
88	1014212	STANDOFF, PROGRAM	5
1	1014048-1	PLATE ASSY	4
1	1014026	COVER, CONN PLATE	3
1	1014258	SUPPORT, FRAME	2
1	1014014-2	FRAME	1

LIST OF MATERIALS

1020156	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

RAYTHEON CO.
LEXINGTON, MASS.
CONTRACT NO. NAS 9-498
DRAWN H. Kelley DATE 26 MAY 64
CHECKED A. Cof[illegible] 27 May 64
APPROVAL H. W. Morse 25 June 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
MIT APPROVAL C. [illegible] 7/5/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC PLATE ASSY NO. 2
PROGRAMMER AND MONITOR

CODE IDENT NO. —
SIZE F
NASA DRAWING NO. 1020158
SCALE 1/1
WT
SHEET 1 OF 1

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER